

17.0 NEXT FIVE-YEAR REVIEW

The next Five-Year Review for the former McClellan is required by April 2009, five years from the date of this review. At that time, some final remedies will have been selected and some of those remedies will be in place; however, it is unlikely that all RODs will have been completed by 2009. The next Five-Year Review will provide a more comprehensive evaluation of the performance and status of actions taken to address all contamination issues and remedial actions at McClellan. The evaluation will also be directed at determining if the actions are operating properly and successfully, to be demonstrated by meeting criteria established in the RODs. This determination will be key to addressing property transfer issues.

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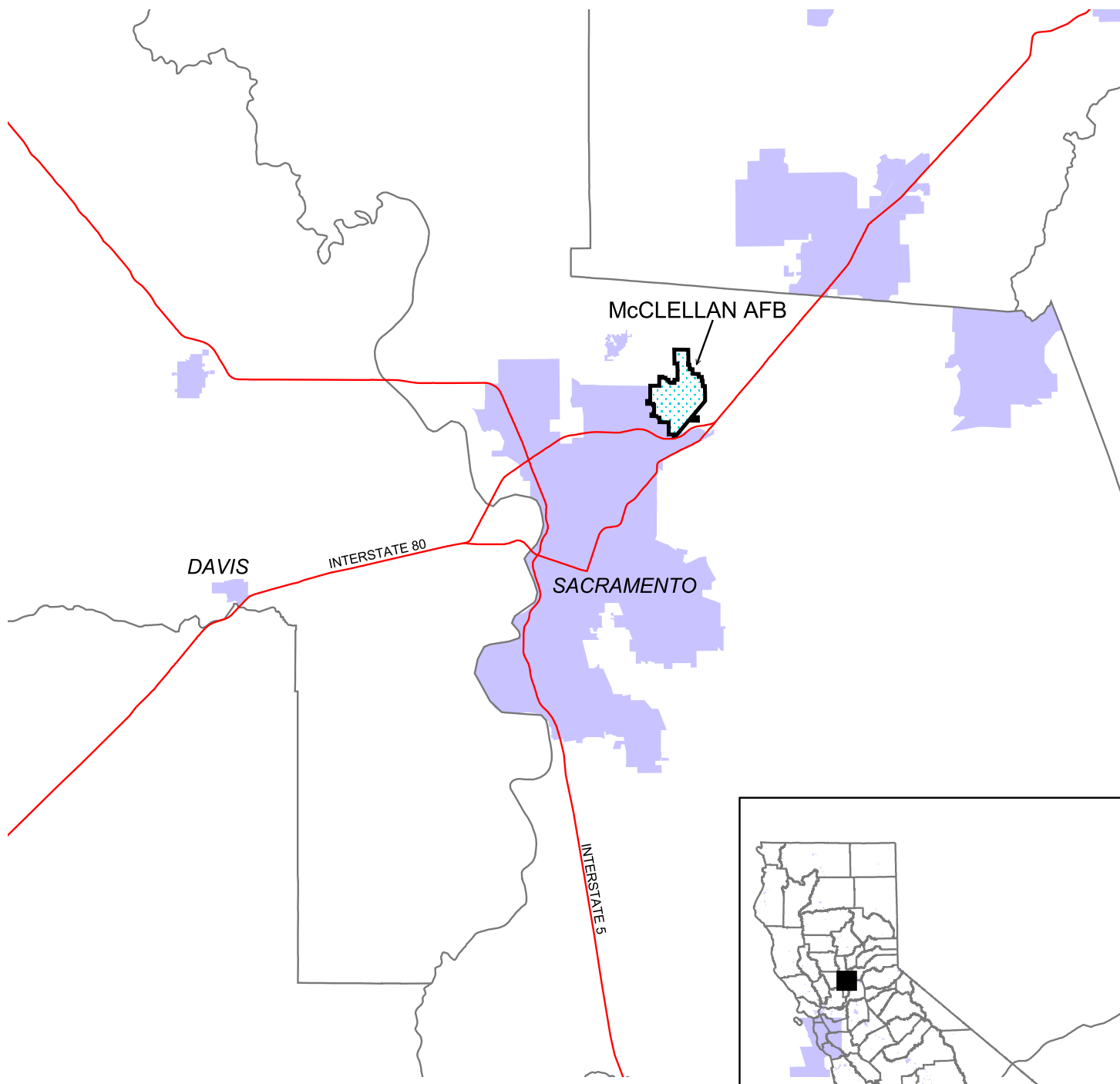
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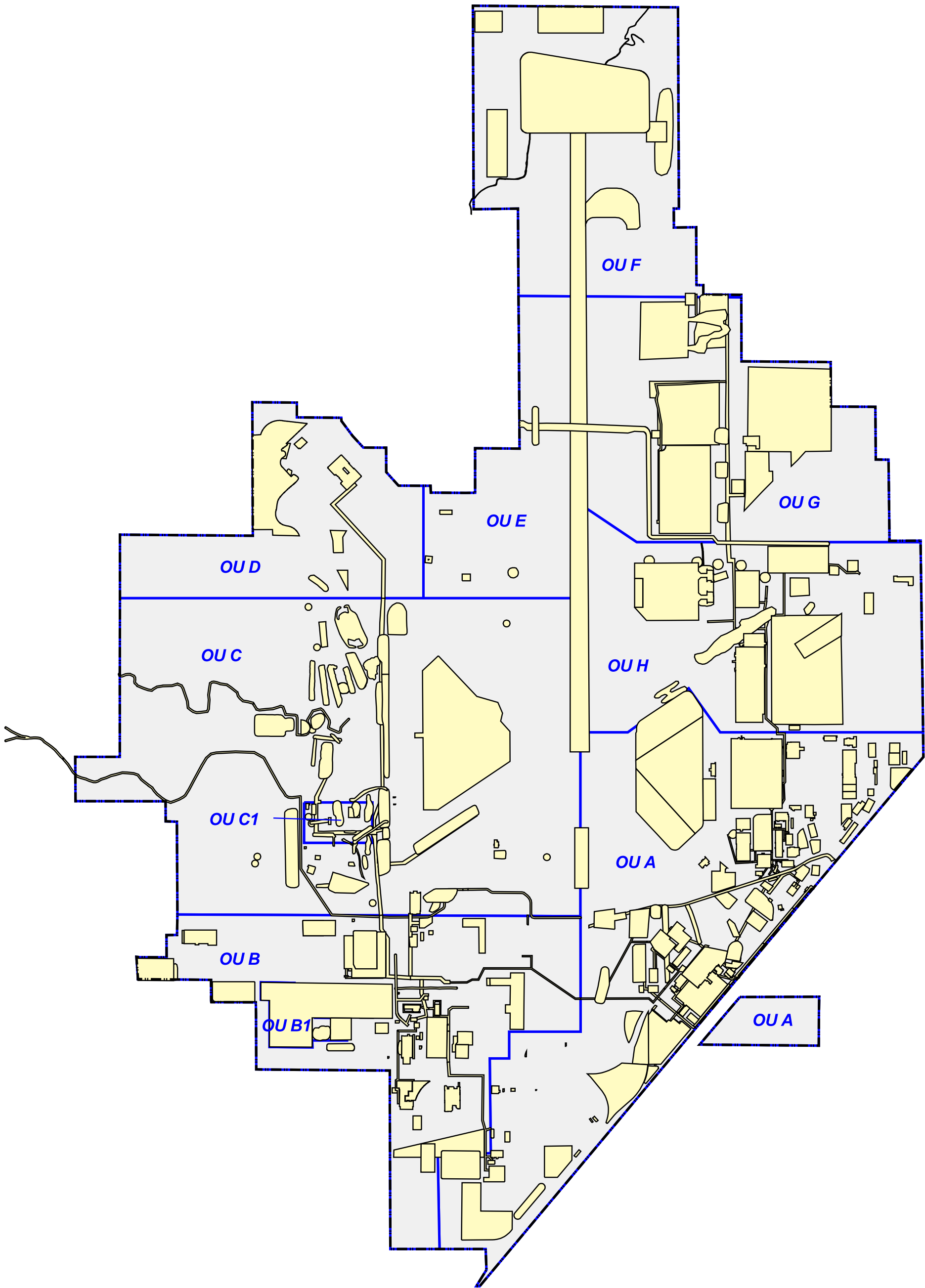
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




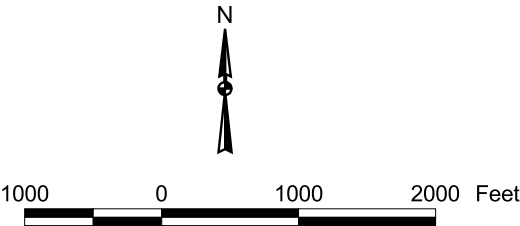
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

SITE LOCATION MAP

FIGURE 3-1



-  SITES AND AREAS OF CONCERN
-  McCLELLAN OPERABLE UNITS
-  BASE PROPERTY LINE



FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

**LOCATION OF SITES
AND OPERABLE UNITS**

FIGURE 3-2

McClellan Strategy & RODs

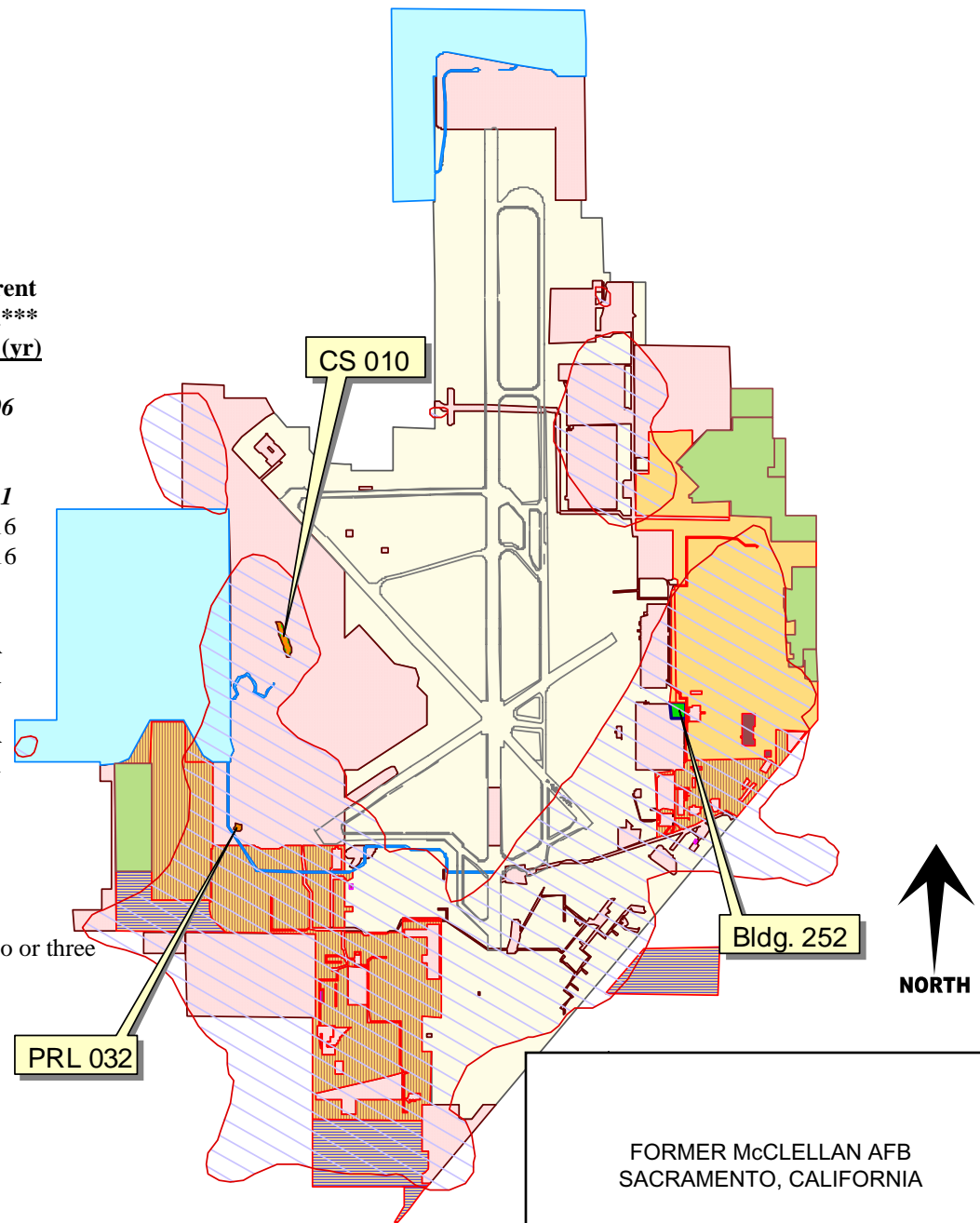
<u>ROD Number and Name</u>	<u>Acreage Impact</u>	<u>Current ROD Date (yr)</u>	<u>Current Deed*** Date (yr)</u>
#1 VOC (Groundwater) ROD	1354*	04	N/A
#2 LRA Initial Parcel ROD #1	92	03	03-06
#11 LRA Initial Parcel ROD #2	185	05	07
#12 LRA Initial Parcel ROD #3	249	06	09
#3 Air Force Small Volume Sites ROD	1166	07	09-11
#4 Confirmed Site 10/PRL 032 ROD	2	08	10-16
#5 Strategic Sites ROD	722	08	12-16
#6 Bldg 252 ROD	1	07	11
#7 Ecological Sites ROD	339	09	12
#8 No Action ROD	3	03 (Done)	N/A
#10 Non VOC GW ROD	TBD**	11	N/A
LRA Initial Parcel FOST	97	N/A	03
#13 Breakout SSG ROD	TBD**	05	N/A
#14 Basewide SSG ROD	TBD**	07	N/A

* Included in other ROD Acreages

** Included in VOC (Groundwater ROD)

*** Property impacted by GW & SSG RODs will require two or three RODs to deed - unless a FOSET is done

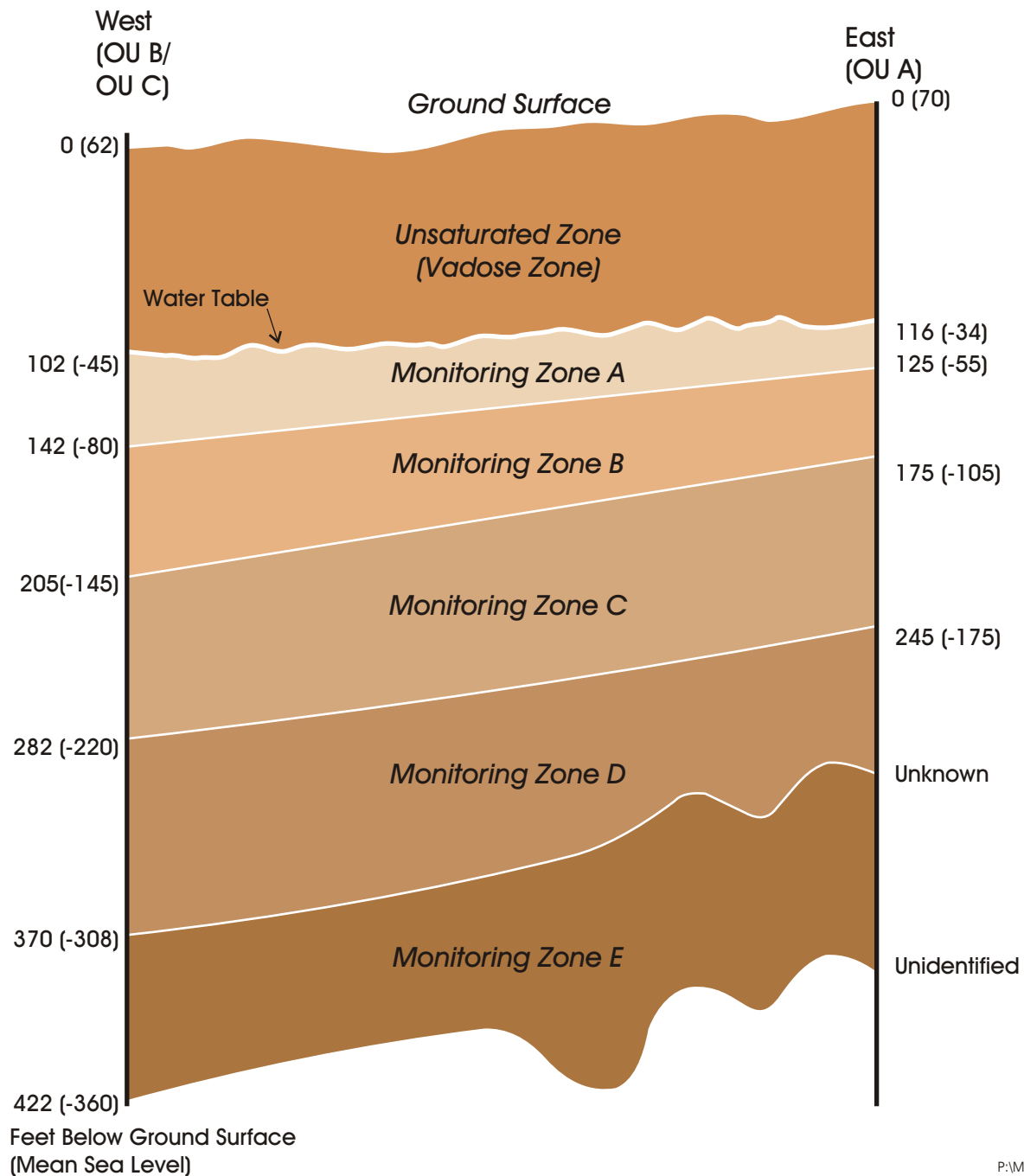
*** With FOSET until VOC ROD Action has reached OPS (2010)



FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

ROD LOCATIONS

FIGURE 3-3



P:\McClellan\Core\4-1

FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

**GENERALIZED HYDROGEOLOGIC
CROSS-SECTION OF McCLELLAN AFB**

FIGURE 4-1

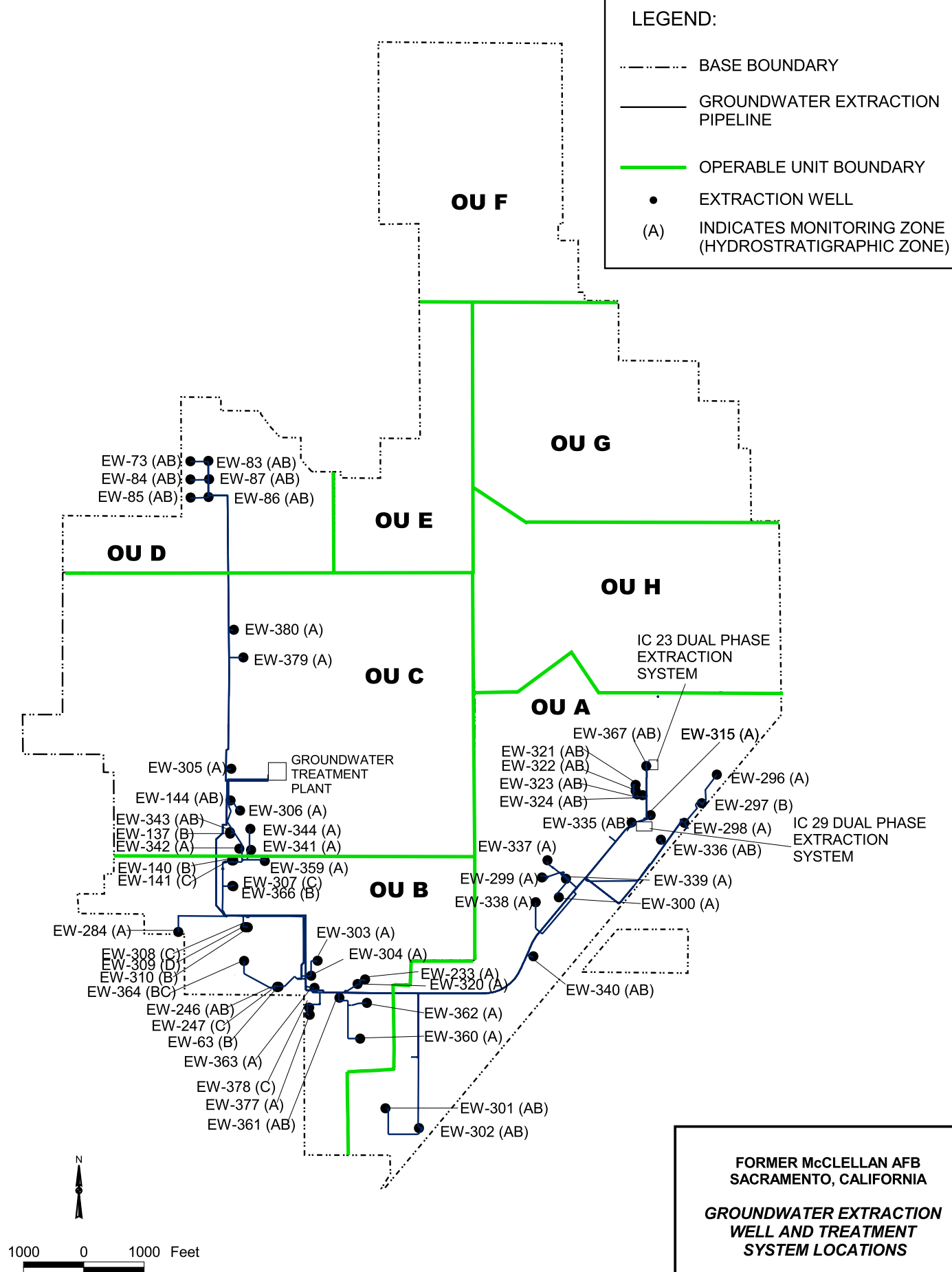
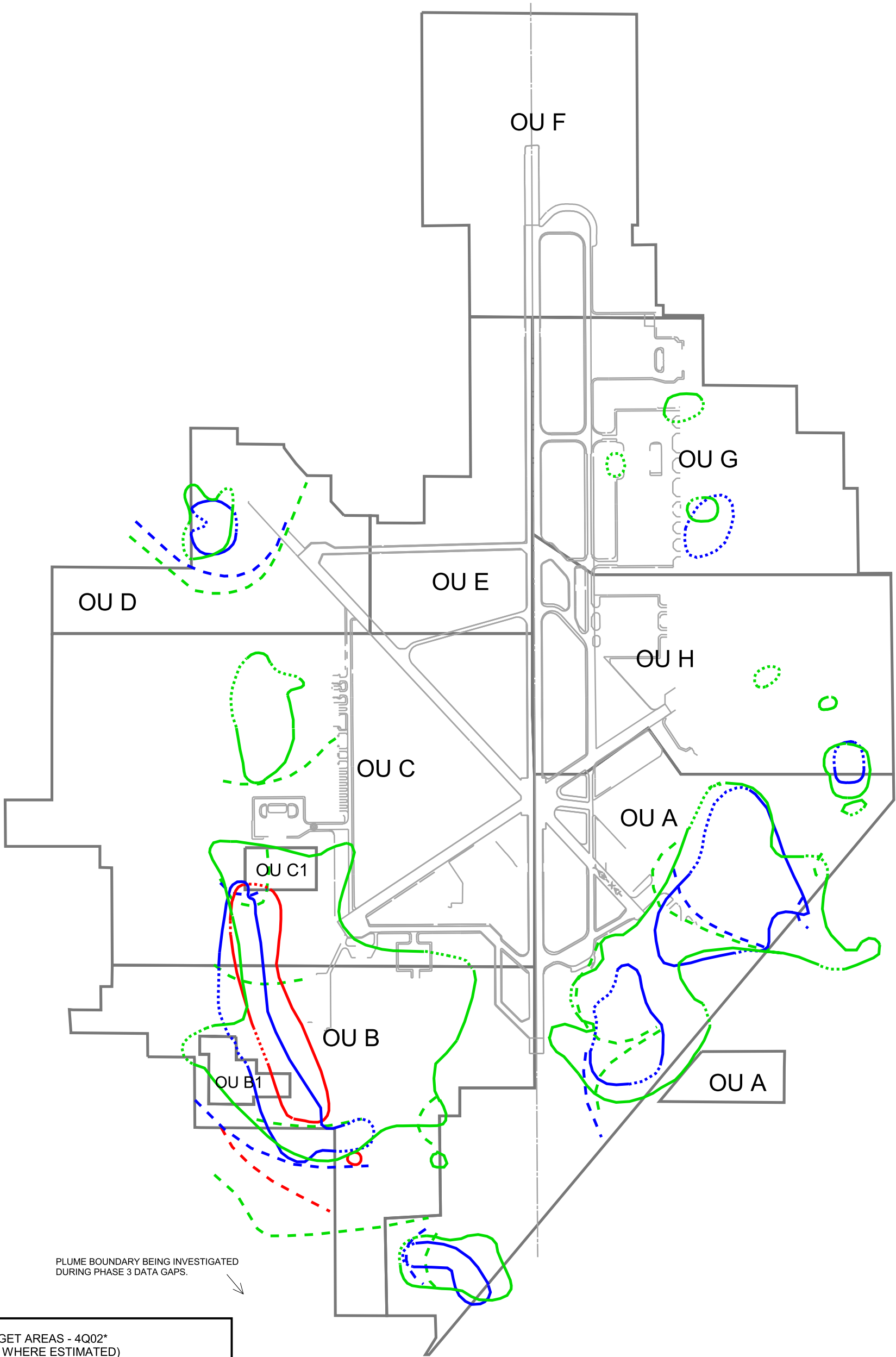


FIGURE 4-2



MCL TARGET AREAS - 4Q02*
(DASHED WHERE ESTIMATED)

- A ZONE
- B ZONE
- C ZONE

* Based on sample analysis for TCE, PCE,
cis-1,2-DCE, and 1,2-DCA

ESTIMATED CAPTURE ZONES

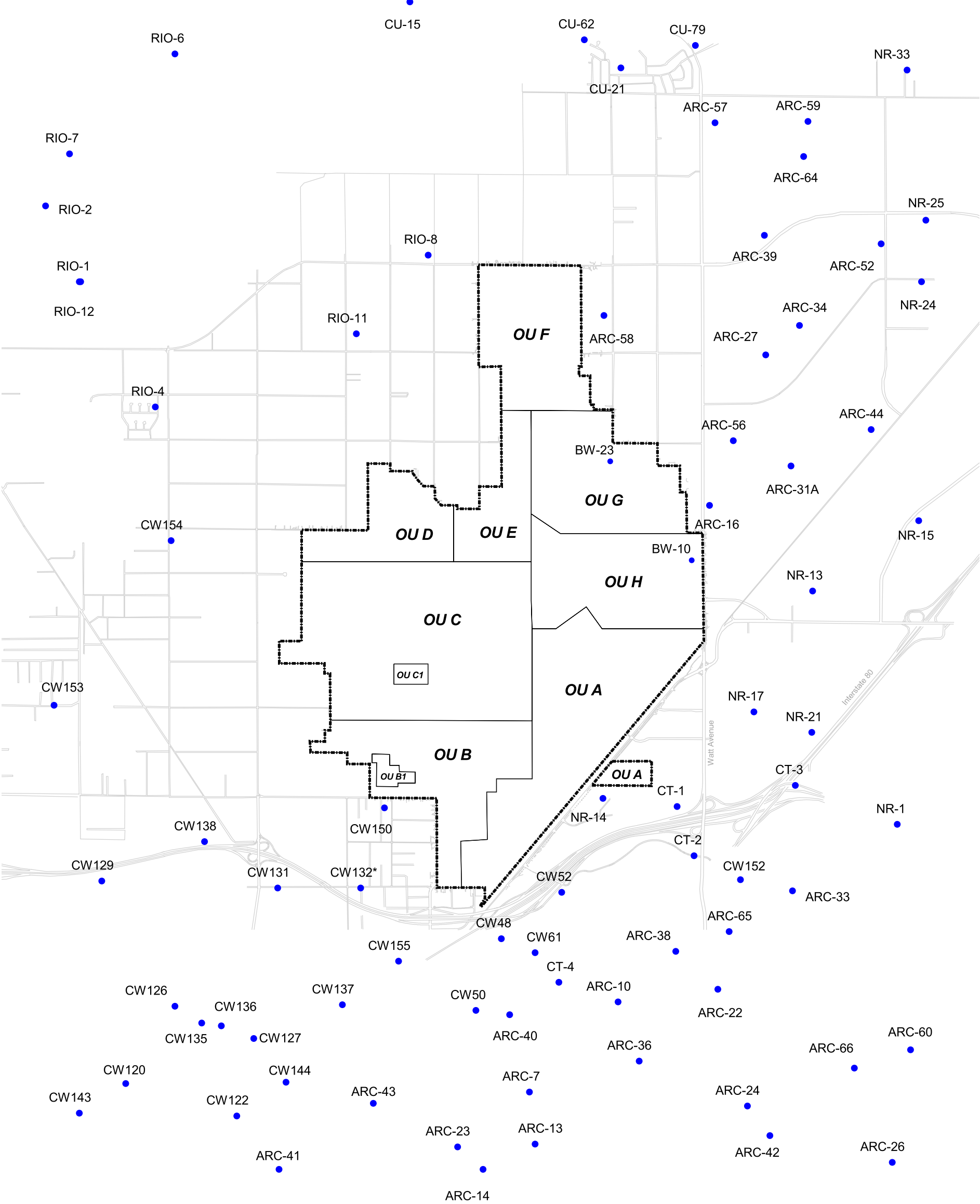
- A ZONE
- B ZONE
- C ZONE

OPERABLE UNIT (OU) BOUNDARY

Sources:
Groundwater Monitoring Program, Quarterly Report,
First Quarter 2003, URS, July 2003I , p. ES 3-7.
Technical Memorandum Off Base GWOU Phase III
VOC Data Gap Investigation, Figure 1-2, MWH, April 2003.

FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA
GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003

FIGURE 4-3



ARC-22 PUBLIC WELL

PUBLIC WELL DISTRICT IDs (PREFIX DEFINITIONS):

- ARC = ARCADE
- CT = CAL TRANS
- CU = CITIZENS UTILITIES
- CW = CITY WELL
- RIO = RIO LINDA
- NR = NORTHRIDGE
- BW = BASE WELL

ARC-132* = SCHEDULED FOR DECOMMISSIONING BY CITY OF SACRAMENTO

OU C McCLELLAN OPERATIONAL UNITS

BASE PROPERTY LINE

FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

OFF-BASE PUBLIC WELL LOCATIONS

FIGURE 4-4

LEGEND:

ISOPLETH OF ESTIMATED CURRENT EXTENT OF TOTAL VOC CONCENTRATIONS IN PARTS PER MILLION BY VOLUME

IC BOUNDARY

OU BOUNDARY

CATOX

CATALYTIC OXIDIZER

VGAC

VAPOR-PHASE GRANULAR ACTIVATED CARBON

FTO

FLAMELESS THERMAL OXIDIZER

scfm

STANDARD CUBIC FEET PER MINUTE (AIRFLOW RATE)

NOTE:
CONTOURS ARE COMPOSITED FROM ALL DEPTHS, ARE
BASED ON THE VERY LIMITED DATA POINTS SHOWN,
AND ARE HIGHLY INTERPRETIVE.

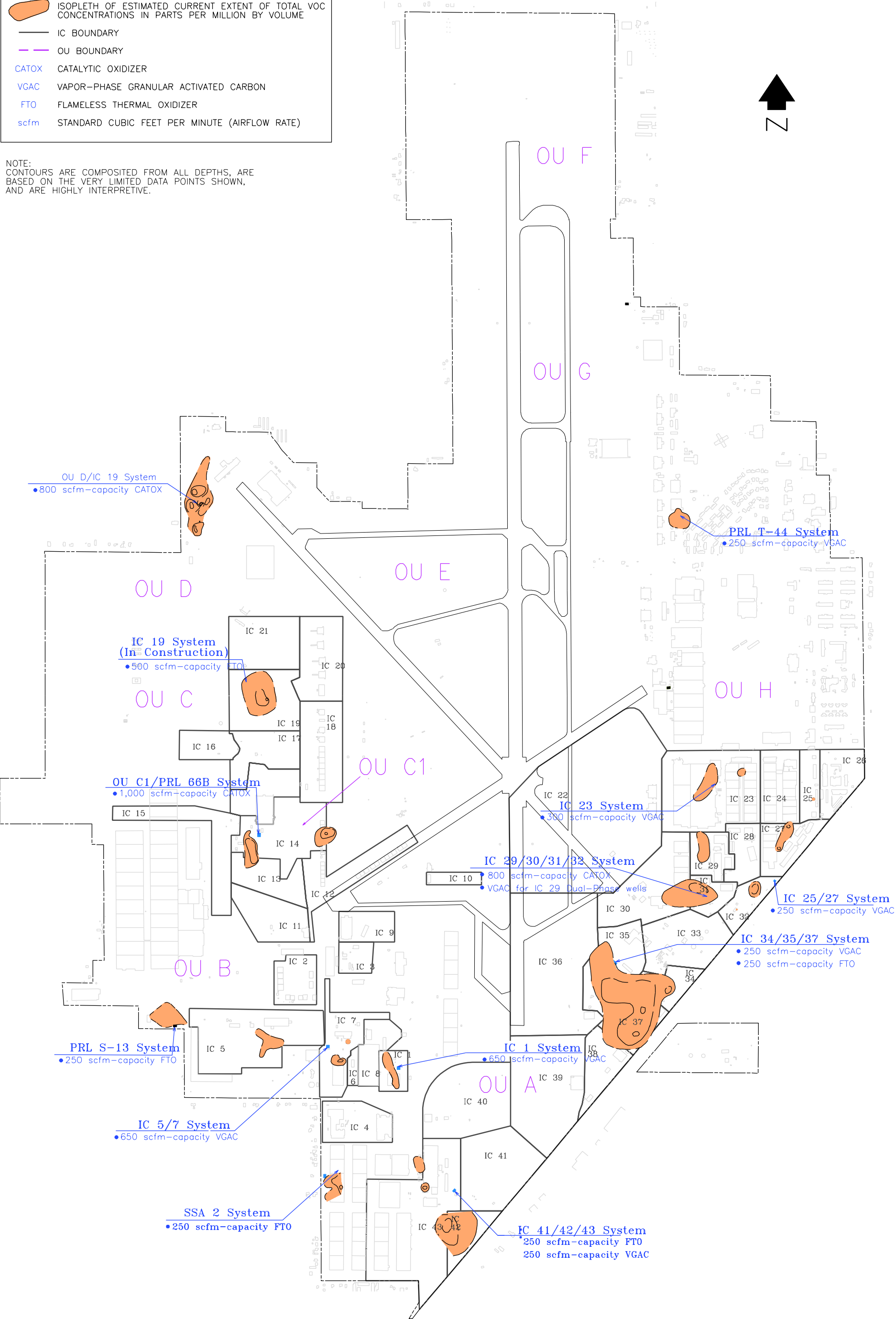
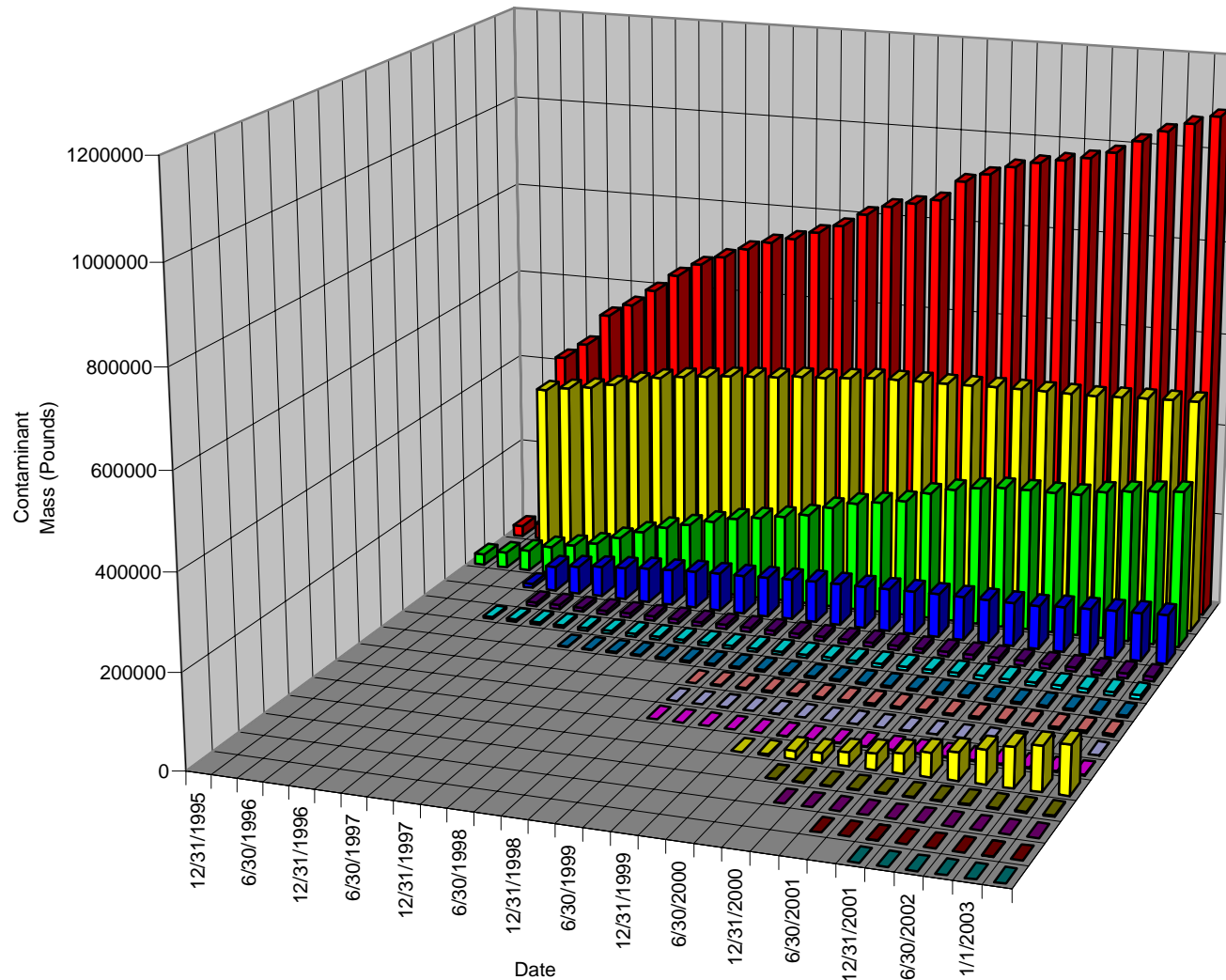


Figure 5-1
SVE Sites and Treatment Systems
McClellan AFB
June 2003

Cumulative Contaminant Mass Volatilization



- SSA 2
- PRL S-13
- IC 41/42/43 VGAC
- IC 41/42/43 FTO
- IC 34/35/37 FTO
- IC 34/35/37 VGAC
- IC 25/27(some IC 32)
- PRL T-44
- IC 23
- IC 1
- IC 5/7
- IC 29/30/31/32
- OU C1/PRL 66B
- SITE OU D/IC19
- Total Contaminant Volatilization

Note: Graph was updated to include contaminant mass volatilized by previous CatOx system at Site OU D on 12/31/01.

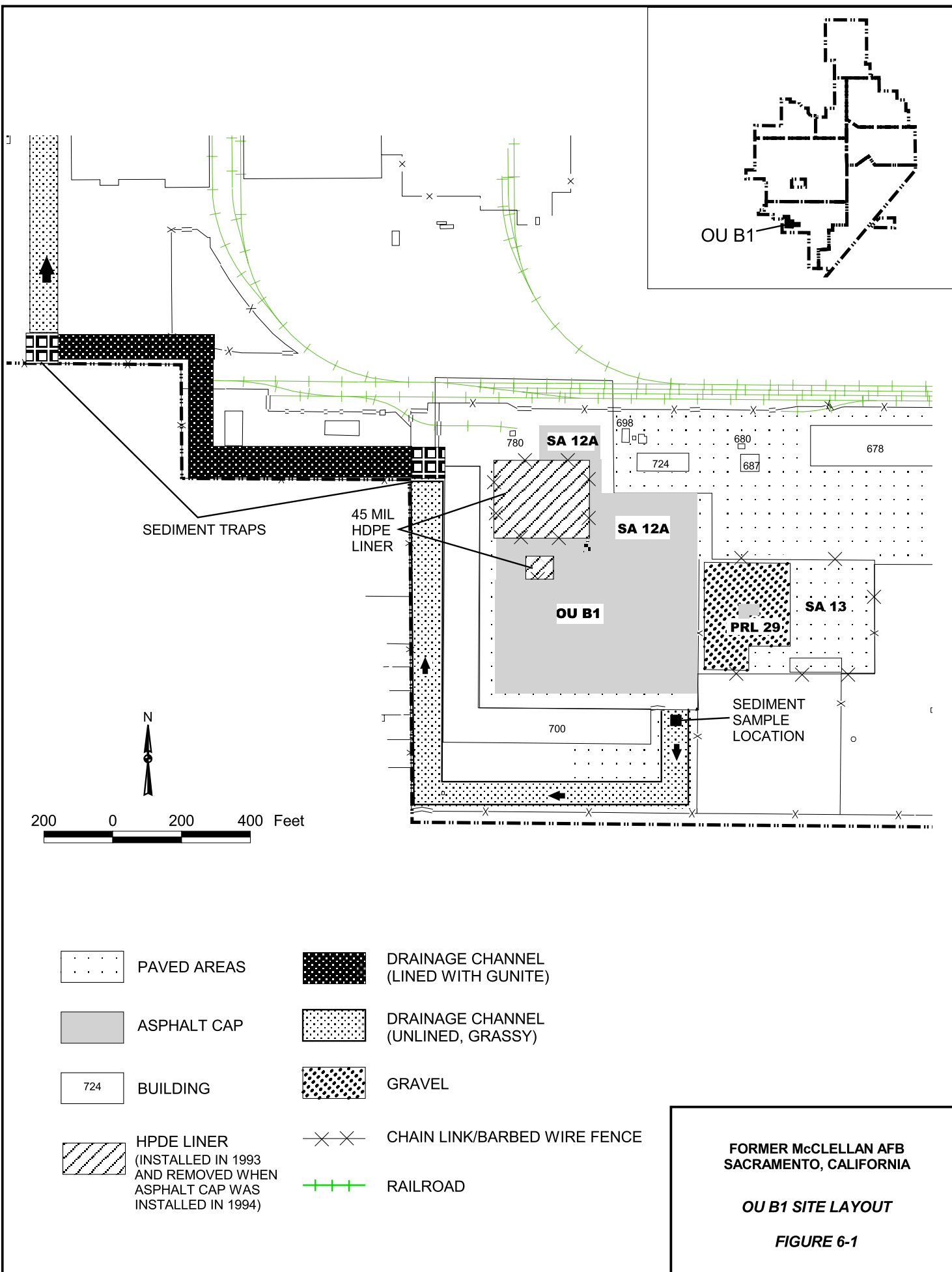
Note: Cumulative contaminant mass volatilized is calculated using TO-15S results (sum of speciated compounds) at all sites except IC 41/42/43 FTO, IC 34/35/37 FTO, IC 29/30/31/32, OU C1/PRL 66B, and Site OU D/IC 19. At these sites, total mass is calculated using modified Method TO-15 (TVH) results.

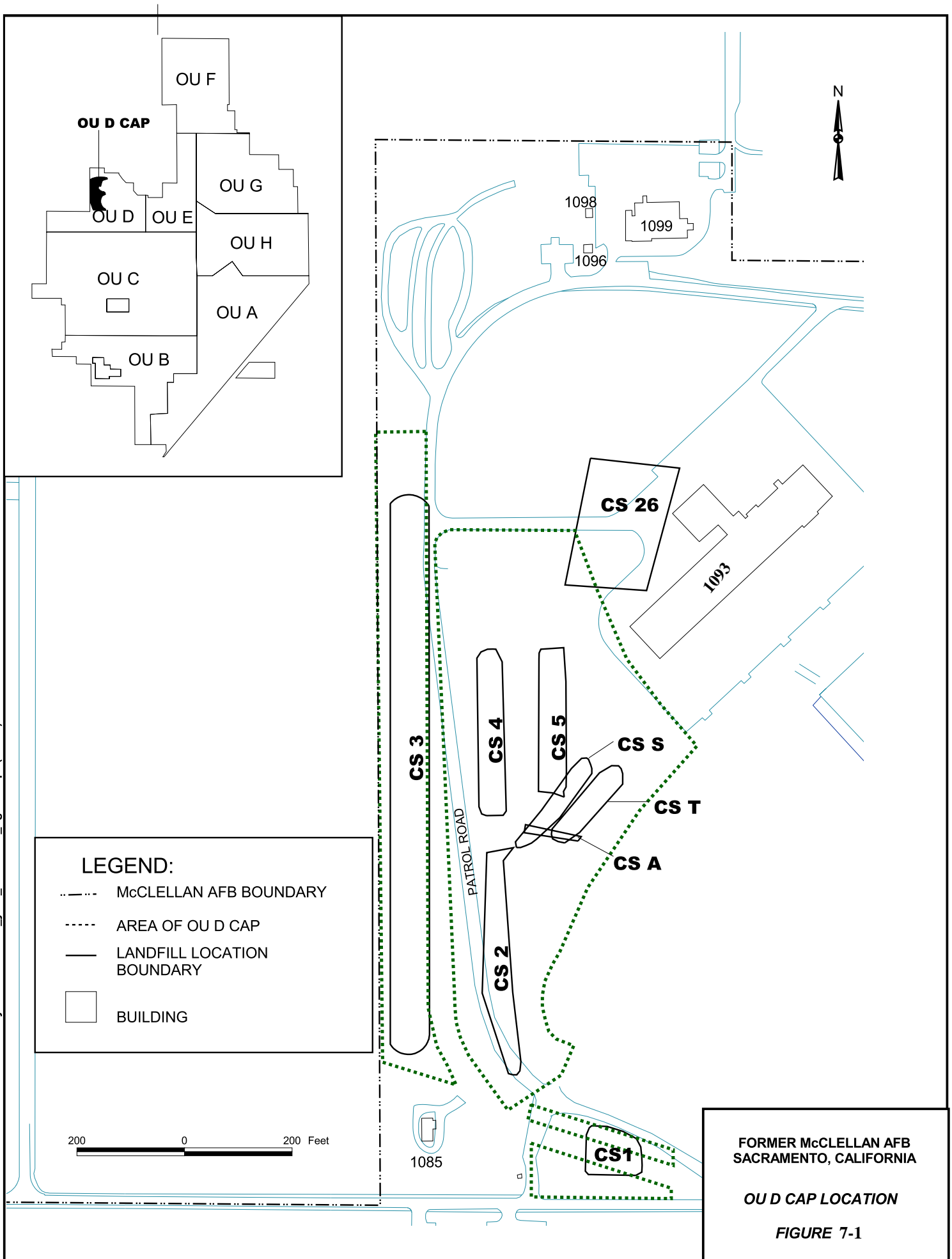
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA

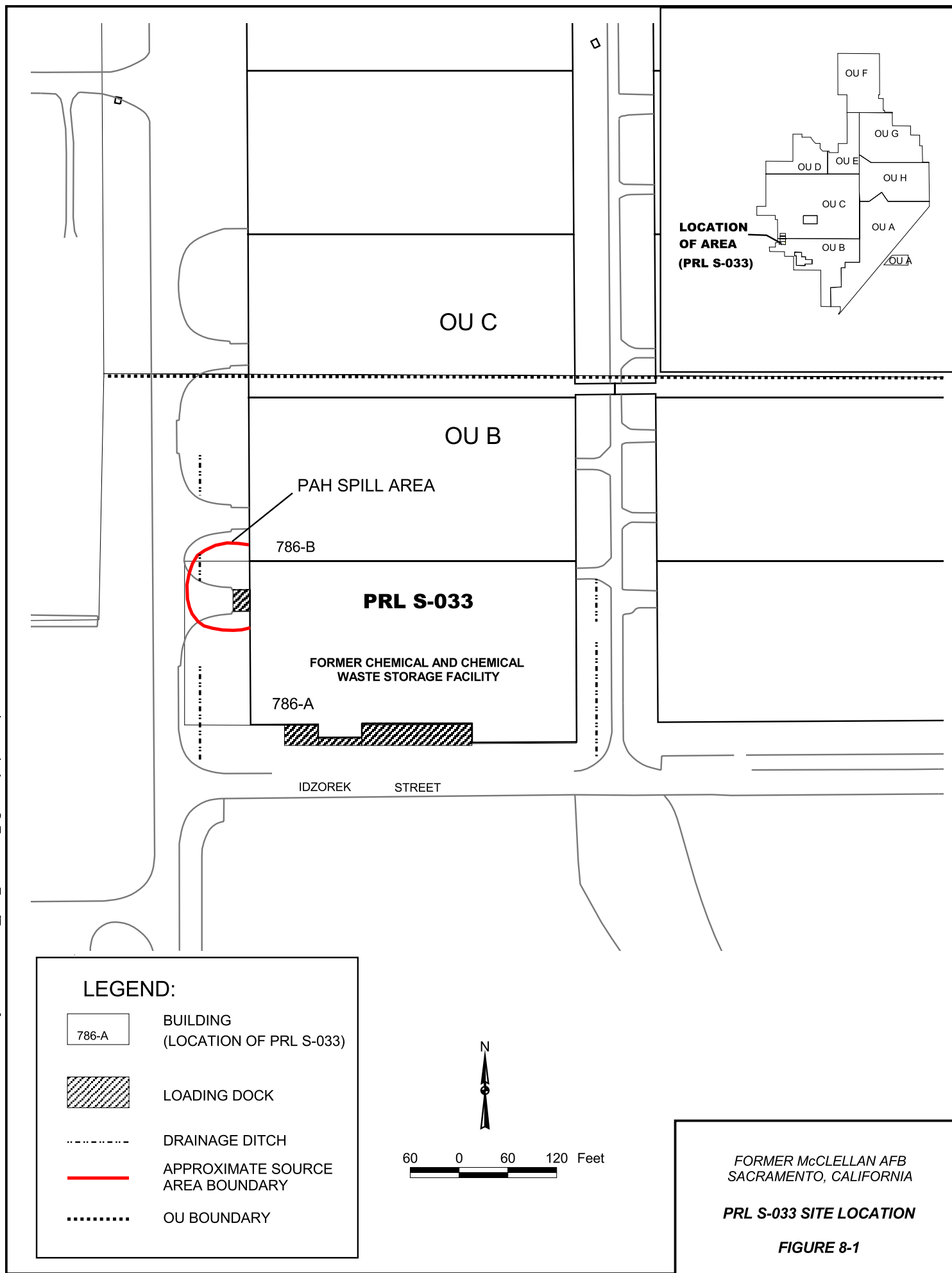
**CUMULATIVE CONTAMINANT MASS
REMOVED**

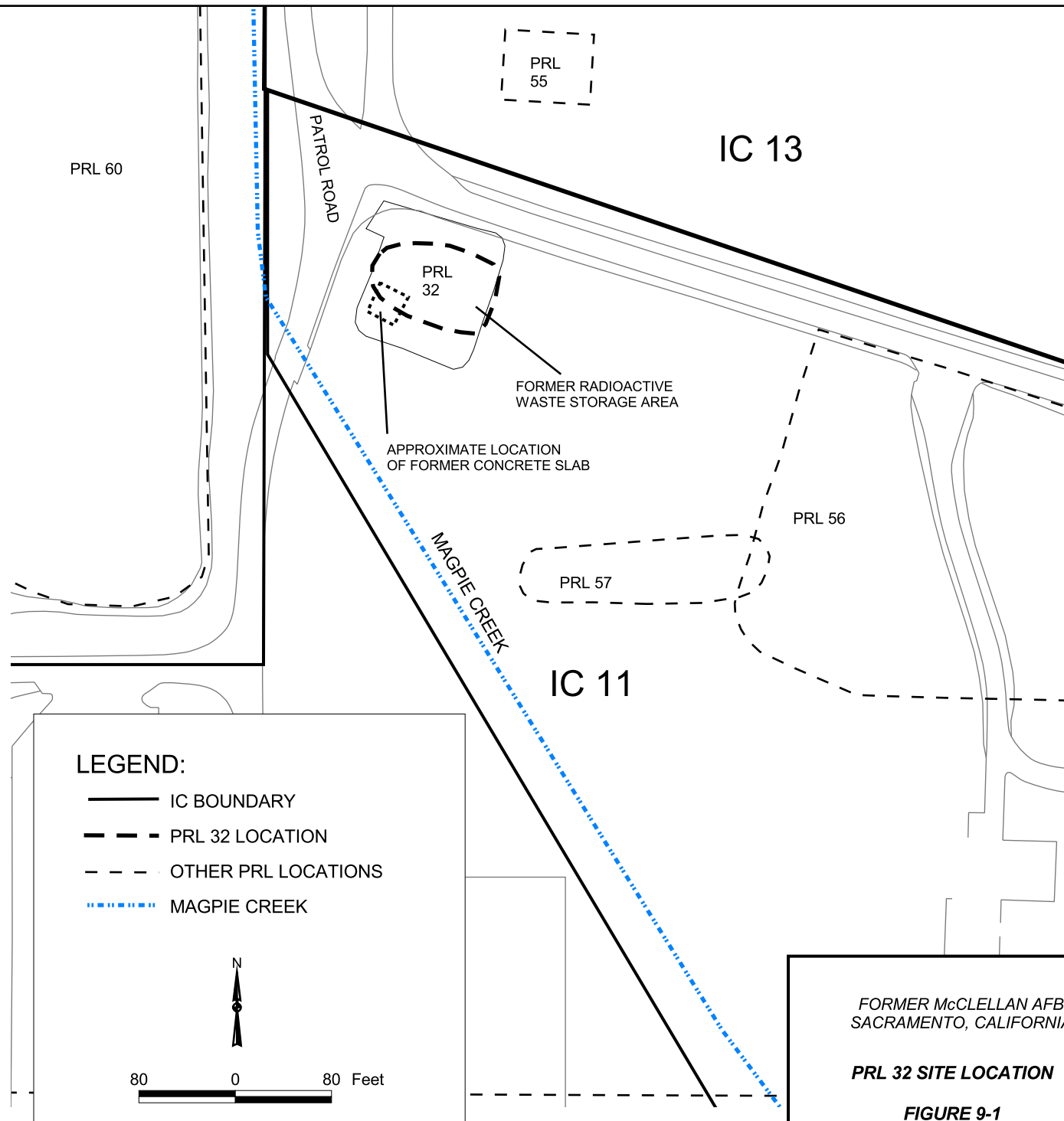
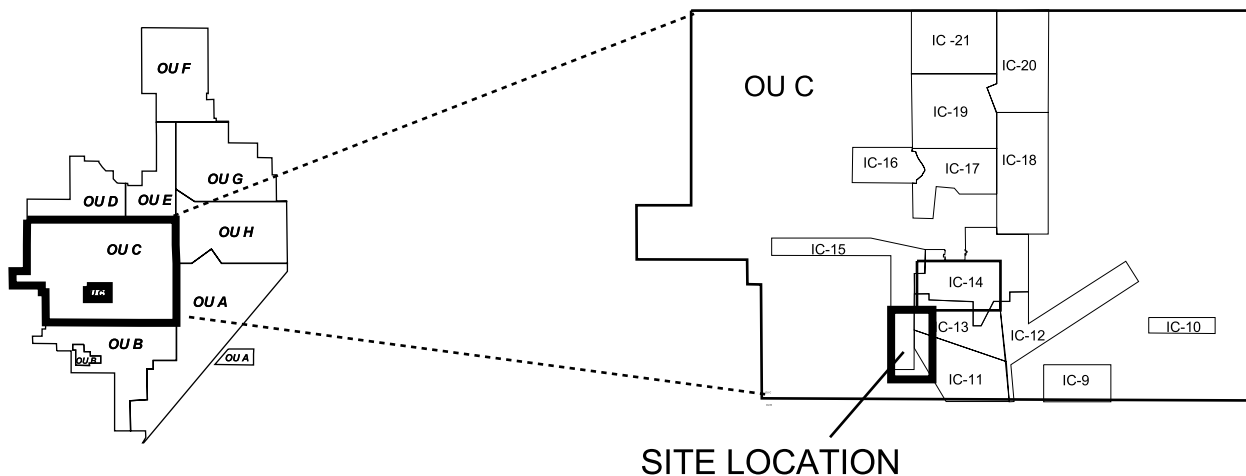
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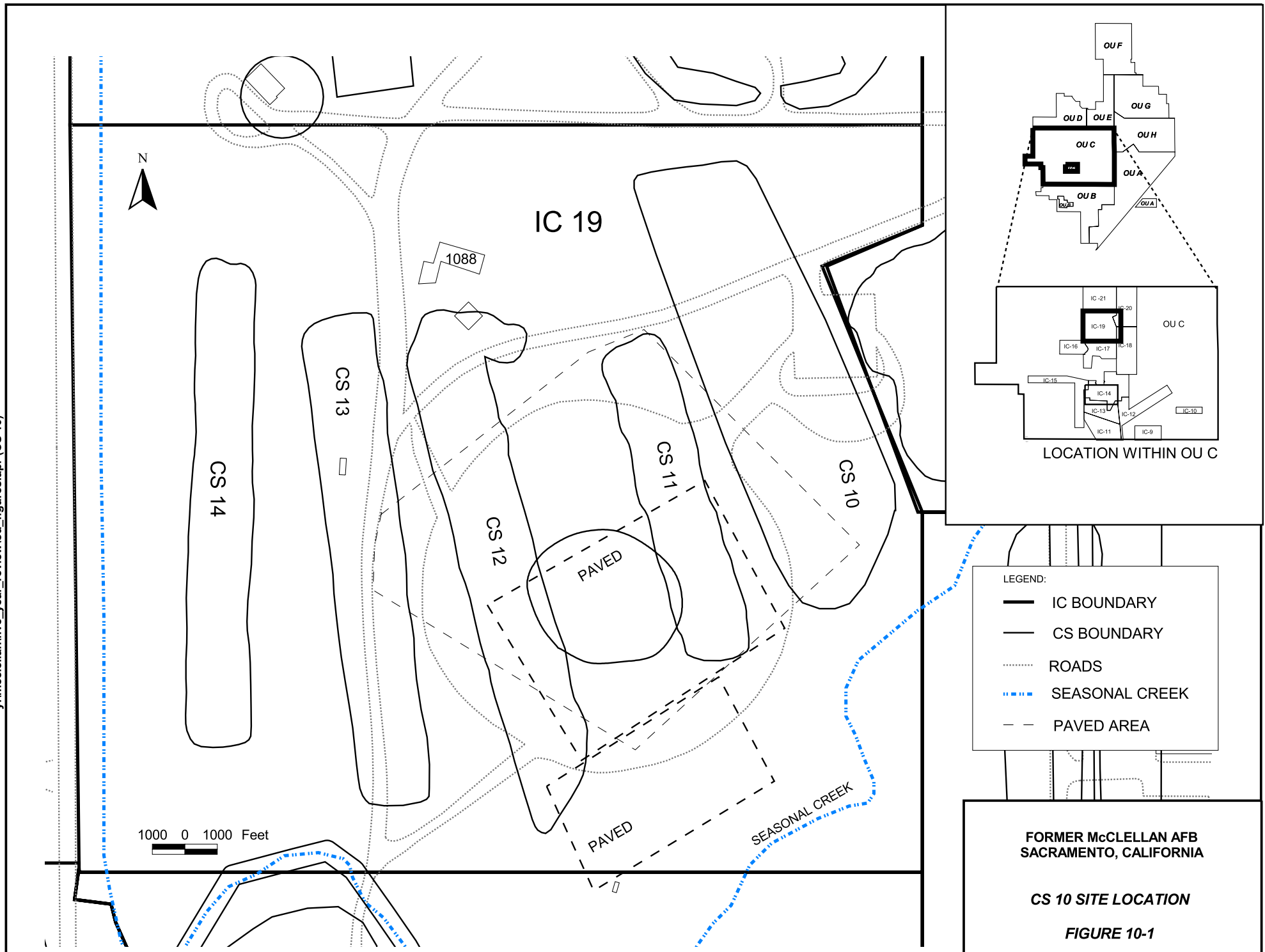
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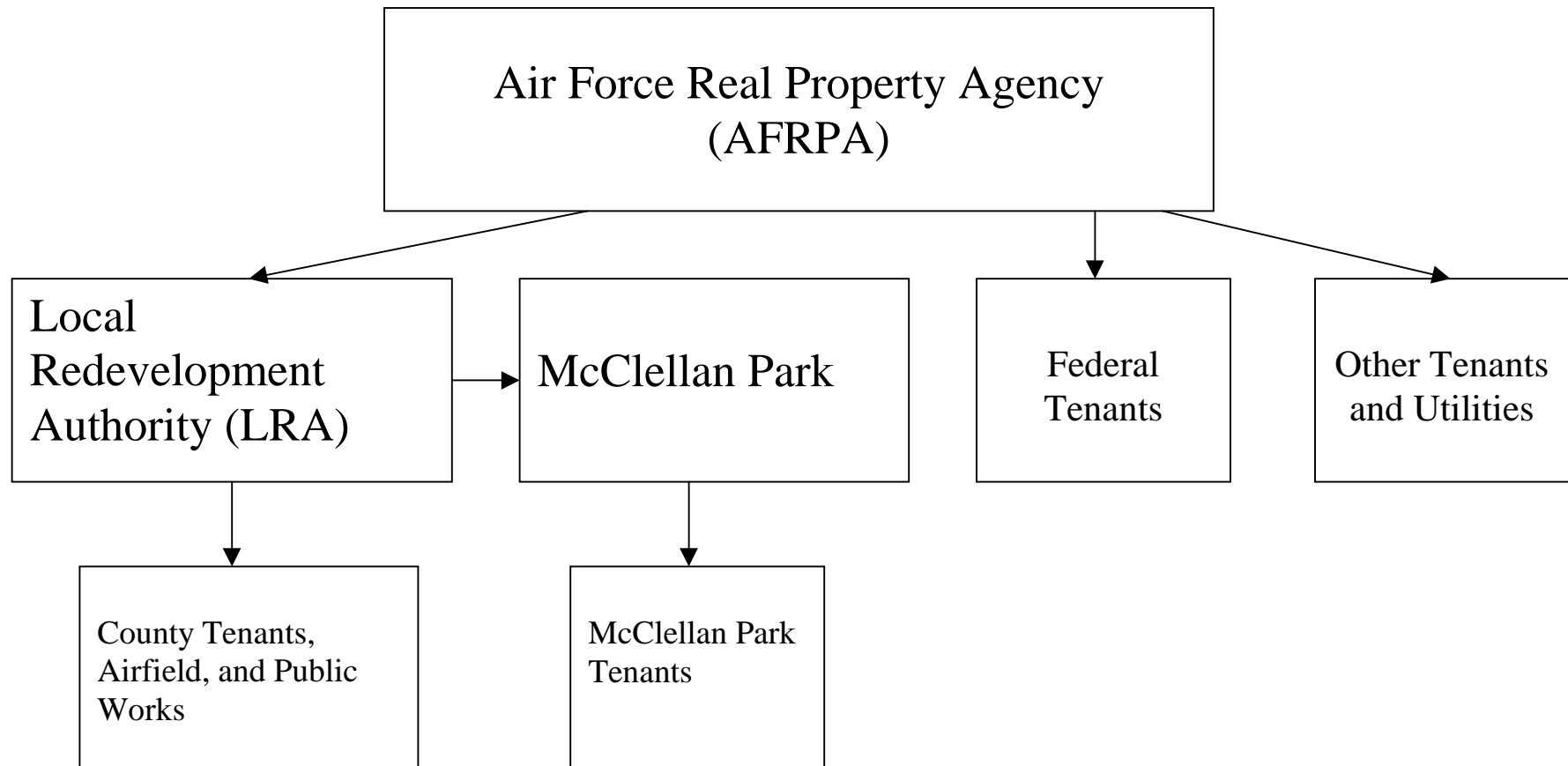








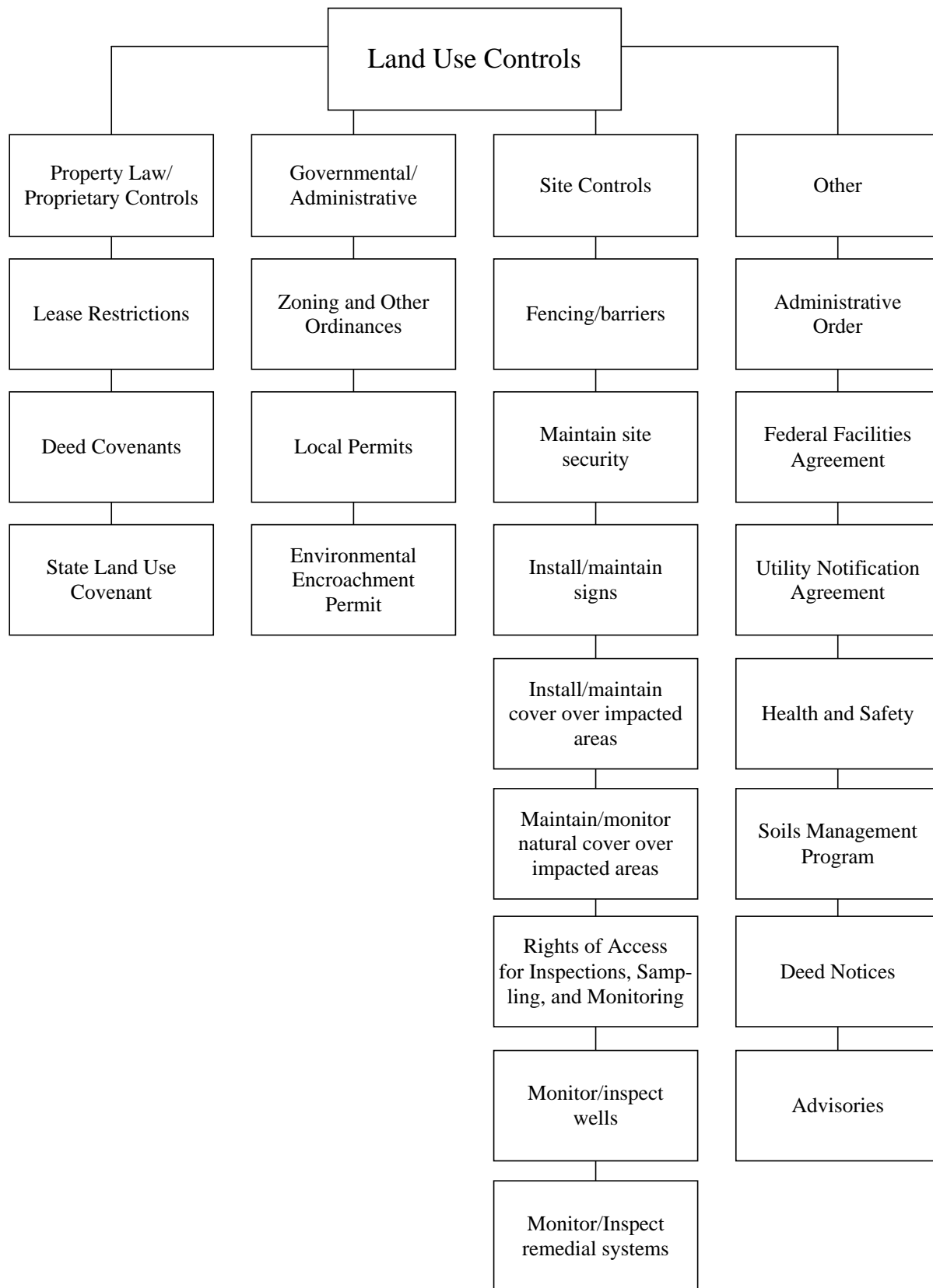
Lease Relationships



Former McClellan AFB
Sacramento, California

**Lease Relationships at
Former McClellan AFB**

Figure 12-1



Former McClellan AFB
Sacramento, California
Land Use Controls

Figure 12-2

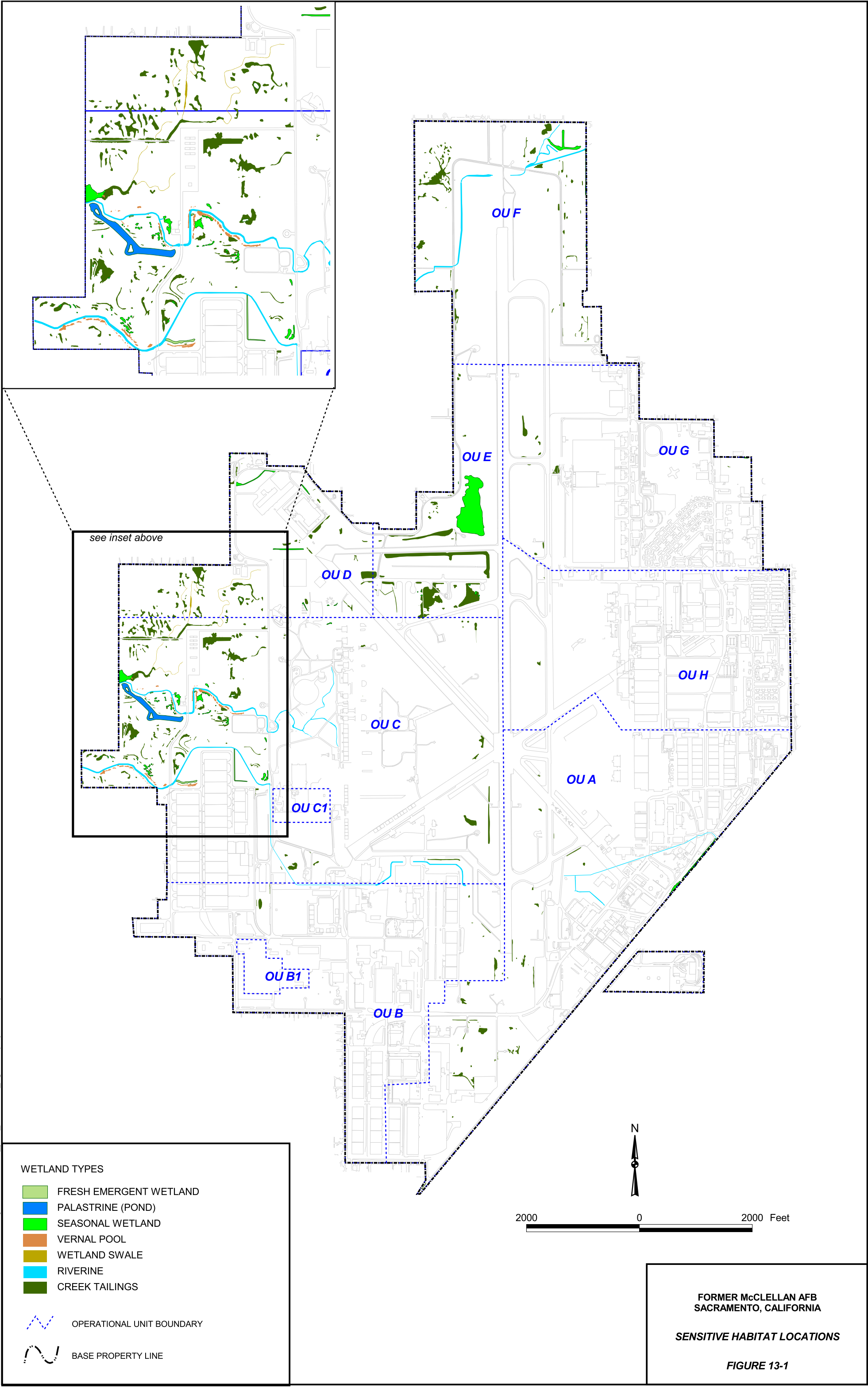


TABLE 1-1

**FIVE-YEAR REVIEW SUMMARY FORM
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Five-Year Review Summary Form – Former McClellan Air Force Base¹

SITE IDENTIFICATION		
Site name (from WasteLAN): McClellan Air Force Base		
EPA ID (from WasteLAN): TBD		
Region: IX	State: CA	City/County: Sacramento/County of Sacramento
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final Deleted Other (specify)		
Remediation status (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating Complete		
Multiple OUs? ² <input checked="" type="checkbox"/> YES NO	Construction completion date: Last Remedy in Place: FY2015 est. Construction Completion: FY2034 est.	
Has site been put into reuse? <input checked="" type="checkbox"/> YES NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA State Tribe Other Federal Agency		
Author name: Mr. Paul Brunner, Base Environmental Coordinator (BEC), McClellan		
Author title: Air Force Real Property Agency (AFRPA)	Author affiliation: Air Force	
Review period: ³ April / 1999 to April / 2004		
Date(s) of site inspection: varied, May 6, 2003 through May 29, 2003		
Type of review: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <input checked="" type="checkbox"/> Post-SARA Pre-SARA NPL-Removal only </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Non-NPL Remedial Action Site NPL State/Tribe-lead </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Regional Discretion </div>		
Review number: 1 (first) <input checked="" type="checkbox"/> 2 (second) 3 (third) Other (specify)		
Triggering actions: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <input type="checkbox"/> Actual RA Onsite Construction at OU #_____ <input checked="" type="checkbox"/> Actual RA Start at OU#B 1 </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input checked="" type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Other (specify) </div>		
Triggering action date (from WasteLAN): 4/11/1994		
Due date (five years after triggering action date): 4/11/1999 (First) 4/11/2004 (Second)		

¹ Source of Summary Form Used: Appendix E, Five-Year Review Guidance Document, USEPA, 2001b.

² “OU” refers to operable unit

³ Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN

TABLE 2-1

KEY PERSONNEL

FIVE YEAR REVIEW

FORMER McCLELLAN AIR FORCE BASE

SACRAMENTO, CALIFORNIA

(Page 1 of 2)

Organization	Contact Name	Title	Phone/Fax	Email
AFRPA	Paul Brunner	BRAC Environmental Coordinator	Phone: (916) 643-1250, Ext. 200 Fax: (916) 643-5880	paul.brunner@afropa.pentagon.af.mil
AFRPA	Mike Zabaneh	Program Manager	Phone: (916) 643-1250, Ext. 258 Fax: (916) 643-5880	mike.zabaneh@afropa.pentagon.af.mil
AFRPA	Joe Saxon (URS) Brian Sytsma (MWH)	McClellan Community Relations	Phone: (916) 643-1742, Ext. 233 Fax: (916) 643-5880	joe.saxon@afropa.pentagon.af.mil brian.sytsma@afropa.pentagon.af.mil
ATSDR	William Nelson	Senior Regional Representative	Phone: (415) 947-4316 Fax: (415) 947-4323	WQN1@CDC.gov
BTAG	Ned Black	USEPA BTAG Coordinator	Phone: (415) 972-3055 Fax: (415) 947-3518	black.ned@epa.gov
California DFG	Jim Hardwick Regina Donahoe	Office of Spill Prevention and Response Office of Spill Prevention and Response	Phone: (916) 327-0911 Fax: (916) 288-7153	jhardwick@opsr.dfg.ca.gov
DTSC	Kevin Depies Tami Trearse	Program Manager	Phone: (916) 255-3688, (916) 255-3747 Fax: (916) 255-3734	kdepies@dtsc.ca.gov ttrearse@dtsc.ca.gov
DTSC	Kris Escarda	Public Participation Specialist	Phone: (916) 255-6683 Fax: (916) 255-3654	kescarda@dtsc.ca.gov
RWQCB	James Taylor	Program Manager	Phone: (916) 464-4669 Fax: (916) 464-4797	taylorjd@rb5s.swrcb.ca.gov
SMAQMD	Loni Adams	Program Manager	Phone: (916) 874-4862 Fax: (916) 874-4899	ladams@airquality.org

TABLE 2-1

**KEY PERSONNEL
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 2)

Organization	Contact Name	Title	Phone/Fax	Email
US EPA	Joseph Healy/ Carmen White	Program Manager	Phone: (415) 972-3269, (415) 972-3010 Fax: (415) 947-3258, (415) 947-3520	healy.joseph@epa.gov White.Carmen@epamail.epa.gov
US EPA	Viola Cooper	Community Involvement Coordinator	Phone: (415) 972-3243/(800) 231-3075 Fax: (415) 947-3258	cooper.viola@epamail.epa.gov
US F&WS	Beckye Stanton	Fish & Wildlife Biologist	Phone: (916) 414-6590 Fax: (916) 414-6713	Beckye_Stanton@FWS.gov
MWH	John Scott	Program Manager	Phone: (916) 565-4218 Fax: (916) 924-3293	john.scott@mwhglobal.com
MWH	Conny Mitterhofer	Task Order Manager	Phone: (916) 921-3546 Fax: (916) 924-3293	cordula.mitterhofer@mwhglobal.com

AFRPA - Air Force Real Property Agency

ATSDR - Agency for Toxic Substances And Disease Registry

BTAG - Biological Technical Assistance Group

DFG - Department of Fish and Game

DTSC - Department of Toxic Substances Control

F&WS - Fish and Wildlife Service

MWH - MWH Americas, Inc.

RWQCB - Regional Water Quality Control Board

SMAQMD - Sacramento Metropolitan Air Quality Management District

US EPA - United States Environmental Protection Agency

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
CS 001	LF001	Landfill	NA	D	0	0
CS 002	LF002	Sludge/oil pit	NA	D	0	0
CS 003	LF003	Sludge/oil pit	NA	D	0	0
CS 004	DP004	Sludge/oil pit	NA	D	0	0
CS 005	DP005	Sludge/oil pit	NA	D	0	0
CS 006	DP006	Oil burn pit	NA	D	0	0
CS 007	SD007	Sludge/oil pit	21	C	5	1
PRL 008	LF008	Sludge refuse/landfill	21	C	5	1
PRL 009	LF009	Possible landfill	20	C	5	1
CS 010	LF010	Landfill	19	C	4	1
CS 011	LF011	Landfill	19	C	5	1
CS 012	LF012	Landfill	19	C	5	1
CS 013	LF013	Landfill	19	C	5	1
CS 014	LF014	Landfill	19	C	5	1
PRL 015	DP015	Sodium valve trench	17	C	5	1
PRL 016	DP016	Sodium valve trench	17	C	5	0
PRL 017	LF017	Possible landfill	14	C	5	0
PRL 018	LF018	Landfill	13	C	5	1
PRL 019	LF019	Possible landfill	13	C	5	0
PRL 020	dp	Sludge/oil pit	14	C	5	0
PRL 021	DP021	Sludge/oil pit	14	C	5	1
CS 022	LF022	Burn pit/landfill	13	C	5	1
CS 023	LF023	Landfill	NA	B	5	0
CS 024	LF024	Landfill	42	A	5	1
PRL 025	LF025	Landfill	36	A	5	1
CS 026	LF026	Sludge/oil burn pit	NA	D	0	0
PRL 027	DP027	Sodium valve trench	NA	D	0	0
PRL 028	DP028	Skimming basin	15	C	5	1
PRL 029	SS029	Landfill	NA	B	5	1
CS 030	DP030	Surface spill area	4	B	5	1
CS 031	SS031	Incinerator ash burial pit	5	B	5	1
PRL 032	SS032	Rad./hazardous wastes	11	C	4	1
PRL 033	WP033	IWTP sludge landfarm	NA	D	5	0
CS 034	ST034	Waste sol. storage tanks	41	A	3	0
PRL 035	DP035	Scrap metal burial pit	7	B	8	0
CS 036	SS036	Open storage area	1	B	12	1
CS 037	LF037	Landfill	36	A	5	1
CS 038	LF038	Engine Repair Shop	37	A	3	1
PRL 039	LF039	Landfill	NA	A	5	0
CS 040	WP040	Indus. wastewater sludge	32	A	5	1
PRL 041	LF041	Landfill	14	C	5	0
CS 042	LF042	Oil storage/landfill	14	C	5	1
CS 043	LF043	Burnpit	17	C	5	1
PRL 045	LF044	Paint waste burial pit	NA	E	5	0
CS 047	SS045	Abandoned plating shop	1	B	12	1
CS 048	WP046	Abandoned IWTP	1	B	12	1

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
PRL 049	LF047	Possible landfill	18	C	5	0
PRL 050	WP048	Settling pond	16	C	5	1
PRL 051	WP049	Holding pond	16	C	7	0
CS 052	DP050	Fill area	17	C	5	0
PRL 053	WP051	Settling pond	NA	C	5	0
PRL 054	SS052	Storage area	13	C	5	0
PRL 055	SS053	Acid storage area/landfill	13	C	5	1
PRL 056	SS054	Storage area	11	C	5	0
PRL 057	LF055	Landfill	11	C	5	0
PRL 060	WP056	Holding ponds	15	C	5	1
PRL 061	WP057	Chemical waste pit	NA	C	5	0
PRL 062	WP058	Chemical waste pit	NA	C	5	0
PRL 063	SD059	Unlined ditch	14	C	5	1
PRL 064	SD060	Unlined ditch	14	C	5	1
PRL 065	LF061	Landfill	9	C	5	0
PRL 066A-D	WP062	Ditches and pond	12	C	5	1
CS 067	WP063	Landfill	17	C	5	1
PRL 068	WP064	Sludge ponds	14	C	5	1
CS 069	DP065	Burn pit	14	C	5	1
BW-18	CG066	Base Well 18	NA	B	0	0
CG067	CG067	Off-base wells, Raley Blvd.	NA		0	0
GWTP	WP068	Groundwater treat. plant	14	C	5	1
PRL B-001	LF069	Landfill	5	B	5	0
PRL B-002	DP070	Spoil pit/borrow pit	NA	A	5	0
PRL B-003	LF071	Landfill	NA	A	5	0
PRL B-004	WP072	Sludge drying bed	NA	A	8	0
CS B-005	LF073	Empty lot	33	A	3	0
PRL B-006	LF074	Waste stripping area	NA	F	5	0
PRL B-007	LF075	Former spoil area	NA	H	5	1
PRL B-009	LF076	Landfill	NA	B	5	0
PRL P-001	SD077	Drainage ditch, former engine test pad	NA	H	3	0
PRL P-002	SD078	Waste pond	5	B	5	1
PRL P-003	WP079	Oil pit	23	A	3	0
PRL P-004	WP080	Sump	31	A	5	1
CS P-005	SD081	Open Ditch	35	A	3	1
CS P-006	SD082	Open Ditch	35	A	3	1
PRL P-007A-D	SD083	Unlined drainage ditch	NA	D	5	0
PRL P-008	WP084	Acid and cyanide pit	40	A	5	0
PRL P-009	SD085	Open drainage ditch	7	B	12	0
PRL S-001	SS086	Plating Shop	29	A	12	1
PRL S-002	SS087	Chemical warehouse	36	A	3	1
PRL S-003	SS088	Acid storage Warehouse	36	A	3	0
PRL S-004	SS089	Treat. plant/sludge beds	36	A	3	1
PRL S-005	WP090	Abandoned IWTP	7	B	5	1
PRL S-006	WP091	IWTP #1	32	A	5	1

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
CS S-007	WP092	IWTP #3	34	A	3	1
PRL S-008	SS093	Electroplating shop, IWTP	23	H	5	0
PRL S-009	SS094	Asbestos Storage	40	A	5	0
PRL S-010	SS095	Rad storage area	NA	C	5	0
PRL S-011	SS096	BCE/PCE storage	10	C	3	1
PRL S-012	SS097	PCB storage	NA	B	5	0
PRL S-013	SS098	Open storage	NA	B	5	1
PRL S-014	SD099	Paint shop/spray booths	26	A	2	0
PRL S-015	SD100	Aircraft repair, electrical/machine shops, foundry	NA	H	5	1
PRL S-016	SD101	Sol./paint spray booths	23	A	5	1
PRL S-017	SD102	Repair shop/spray booths	23	A	5	0
PRL S-018	SD103	Repair shop/clean shop	23	A	6	1
PRL S-019	SS104	Entomology storage area	32	A	3	1
PRL S-020	SD105	Photo lab	27	A	5	1
CS S-021	SD106	Degreaser/spray booths	31	A	5	1
PRL S-022	SD107	Repair shop/spray booths	29	A	12	1
PRL S-023	SD108	Plating shop	NA	A	12	1
CS S-024	SD109	Depaint washrack	30	A	5	1
PRL S-025	SD110	Transformer shop	35	A	3	1
CS S-026	SD111	Mainshop/spray booth	37	A	3	1
CS S-027	SD112	Solvent recovery stills	37	A	3	1
PRL S-028	SS113	Oil/paint storage	NA	B	12	1
PRL S-029	SS114	Equipment repair	8	B	5	1
PRL S-030	SD115	Depaint washrack	8	B	5	1
PRL S-031	SD116	Aircraft paint hanger	9	C	5	1
PRL S-032	SS117	Paint storage area	9	C	5	0
PRL S-033	SS118	Hazardous mat. storage	NA	B	2	0
PRL S-034	SD119	Degreaser/paint booth	7	B	12	1
PRL S-035	SD120	Solvent spray booth	7	B	12	1
PRL S-036	SS121	Oil drum storage	39	A	3	1
PRL S-037	SS122	Oil drum storage	39	A	3	1
PRL S-038	SS123	Drum storage	36	A	3	1
PRL S-039	SS124	Former aircraft maintenance area (Current museum site)	NA	H	11	1
PRL S-040	SD125	Aircraft maintenance/engine testing area	NA	H	2	1
PRL S-041	SD126	MAT K storage	NA	B	12	1
PRL S-042	SD127	Auto/Hobby shop/washrack	NA	G	5	0
PRL S-043	SD128	Aircraft washrack	NA	G	5	1
PRL S-044	SD129	Aircraft maintenance area	NA	G	5	0
PRL S-045	SD130	Aircraft maintenance area	NA	H	3	0
PRL T-006	ST131	UST	43	A	12	1
PRL T-007	ST132	Sol pit/waste thinner tank	43	A	5	1
PRL T-008	ST133	Fuel tank	2	B	12	1
PRL T-010	ST134	Solvent tank	30	A	3	1

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 4 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
PRL T-011	ST135	Solvent UST at Bldg. 1093	NA	D	5	0
CS T-012	ST136	Waste oil/solvent tank	33	A	3	1
PRL T-015	ST137	Tank Farm I	35	A	3	1
CS T-016	ST138	Tank Farm 2	34	A	3	1
CS T-017	ST139	Tank Farm 3W	31	A	3	1
PRL T-018	ST140	Tank Farm 4	28	A	12	1
PRL T-19	ST141	Tank Farm 5	32	A	3	1
CS T-020	ST142	Tank Farm 6	37	A	3	1
CS T-021	ST143	UST	33	A	3	1
CS T-030	ST144	UST	23	A	6	1
PRL T-031	ST145	UST	NA	G	5	0
PRL T-032	ST146	UST, Aircraft maintenance	NA	G	3	0
PRL T-033	ST147	UST, Aircraft maintenance	NA	G	5	0
CS T-036	ST148	UST	31	A	12	1
CS T-037	ST149	UST	31	A	12	1
PRL T-044	ST150	Firehouse, engine repair facility	NA	G	3	1
CS A	DP151	Sludge disposal pit	NA	D	0	0
CS S	DP152	Fuel/solvent/oil burn pit	NA	D	0	0
CS T	DP153	Fuel/solvent sludge pit	NA	D	0	0
PRL T-045	SD154	Oil/water separator	NA	B	12	0
PRL T-046	SD155	Defuel Fac. Tanks	2	B	12	1
CS T-047	SD156	Oil/water separator	32	A	3	1
PRL T-048	SD157	Oil/water separator UST	2	B	12	1
PRL L-001A-C	WL158	Indus. wastewater line	NA	G-H	5	0
PRL L-002A-D	WL159	IWL	23	A	5	1
PRL L-003A-B	WL160	IWL	35	A	5	1
PRL L-004A-B	WL161	IWL	37	A	5	1
PRL L-005A-G	WL162	Indus. wastewater line	1	B	5	1
PRL L-006A-B	WL163	Indus. wastewater line	4	B	5	1
PRL L-007A-D	WL164	Indus. wastewater line	12	C	5	1
PRL P-010	SD165	Magpie Creek		C	7	1
PRL S-046	SS166	Unknown	15	C	5	0
PRL S-047	SS167	Boiler Room, drainage trench	20	H	11	0
PRL S-048	SS168	Jet Engine Test Pad	NA	C	5	1
CS T-057	WL169	IWL drain at Bldg. 431	12	A	3	1
CS T-059	ST170	UST	35	A	3	1
PRL T-060	ST171	UST	33	B	12	1
CS T-061	ST172	UST	6	A	3	0
PRL T-062	ST173	UST	40	G	3	0
Davis	SS174	Davis (FFSRA)	NA		0	0
Lincoln	ST175	Lincoln	NA		0	0
Wilson Park	LF176	Wilson Park	NA		0	0
Camp Kohler	ST177	Camp Kohler	NA		5	0
VZ	DP178	Vadose Zone	NA		5	1
SA 001	WP179	Surface disposal	NA	B	5	0

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 5 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
SA 002	SS180	Laboratory	NA	B	5	0
SA 003	SD181	Washrack	4	B	2	1
SA 004	SS182	Paint shop	3	B	5	1
SA 005	SS183	Paint storage/boiler	NA	B	12	0
SA 006	SS184	Gas station	6	B	12	1
SA 007	SD185	Washrack	6	B	12	1
SA 008	ST186	UST	7	B	5	0
SA 009	SS187	Hazardous mat. storage	NA	B	3	0
SA 010	SS188	Entomology sumps	NA	B	12	0
SA 011	ST189	UST	3	B	12	1
SA 012A-D	SS190	Transformer oil area waste pit	7	B	5	0
SA 013	SS191	Chemical storage area	5	B	5	0
SA 014	SD192	Storm water drainage	5	B	12	1
SA 015	SS193	NW corner lot 10 spill	7	B	12	0
SA 016	SD194	Hangars/storage area	NA	B	12	1
SA 017	SS195	Oil storage yard	2	B	8	0
SA 018	SS196	Oil storage yard	3	B	12	0
SA 019	SD197	Spray booth	7	B	12	0
SA 035	ST198	UST	3	A	2	1
SA 037	SS199	Motor pool	25	A	11	1
SA 038	ST200	UST	25	A	11	1
SA 040	SS201	Chemical storage area	25	A	5	0
SA 041	SS202	Metal fabrication	26	A	2	1
SA 043	SS203	Jet maintenance facility	26	A	3	0
SA 044	WP204	Sump	22	A	5	0
SA 045	SS205	Soil contamination	22	A	5	1
SA 046	ST206	UST	27	A	11	1
SA 047	SD207	Washrack 254	24	A	3	1
SA 048	ST208	Warehouse	23	A	11	0
SA 049	ST209	UST	24	A	11	1
SA 052	ST210	Blowdown Tanks	24	A	3	0
SA 053	WP211	Washrack	37	A	12	1
SA 054	ST212	Aboveground storage tank	27	A	3	0
SA 055	SS213	Laboratory	33	A	5	1
SA 056	SD214	Wastewater	28	A	3	1
SA 058	SS215	Chemical storage tank	34	A	5	1
SA 059	ST216	UST	27	A	12	1
SA 060	WP217	Industrial wastewater drain	27	A	3	1
SA 061	SD218	Solvent spray booth	38	A	12	1
SA 064	SS219	Chemical storage	31	A	8	0
SA 065	WL220	IWL	28	A	12	0
SA 066	SS221	Motor pool	28	A	5	1
SA 067	SS222	Soil contamination	28	A	5	1
SA 068	SS223	Aircraft maintenance	29	A	3	1
SA 069	WP224	Steam Fac./UST	30	A	12	1
SA 070	WL225	IWL	29	A	5	1

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 6 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
SA 071	SS226	Hazardous material storage	29	A	12	0
SA 073	WP227	Sump	28	A	3	1
SA 074	ST228	AST, UST	30	A	12	0
SA 075	OT229	IWL	28	A	3	0
SA 076	SS230	Hazardous mat. storage	38	A	3	0
SA 077	ST231	Aboveground storage tank	39	A	3	1
SA 078	SD232	Locomotive washrack	38	A	3	1
SA 079	ST233	Fuel Test Fac.	38	A	3	1
SA 080	SS234	Contractor staging	37	A	3	1
SA 081	ST235	Fuel lines	35	A	3	1
SA 084	SD236	Spray booth	35	A	5	1
SA 085	WP237	Oil/Water Separator	33	A	3	0
SA 086	WP238	Engine Test/UST	34	A	5	1
SA 087	ST239	UST	34	A	3	1
SA 088	SS240	Soil contamination	43	A	12	0
SA 089	SS241	Open storage area	41	A	3	0
SA 090	SS242	Washrack	43	A	12	1
SA 091	SS243	Soil contamination	43	A	2	0
SA 093	RW244	Radiochem. Lab.	40	A	5	1
SA 094	ST245	Open storage area	36	A	3	1
SA 095	ST246	UST	41	A	3	1
SA 096	WP247	UST	38	A	3	1
SA 097	SD248	Tank farm	34	A	3	1
SA 098	SS249	Spray booths	24	A	11	1
SA 099	ST250	Sewage Treat/UST	32	A	3	1
SA 100	ST251	Doc. Destruct./UST	31	A	3	1
SA 101	WP252	Sump	28	A	5	1
SA 103	SS253	Soil contamination	40	A	12	0
SA 105	SS254	Laboratory	40	A	12	1
SA 106	ST255	Salvage Yard/UST	38	A	3	0
SA 107	SS256	Engine Test Stands	35	A	3	1
SA 108	SD257	Aircraft fluids	22	A	3	0
SA 109A-E	SD258	Magpie Creek contamination	30	A	5	1
AOC E-1	SS259	Aircraft revetment, diesel UST	NA	E	3	0
AOC F-2	CF260	Soil disposal area	NA	F	7	0
AOC F-3	SS261	Runway	NA	F	3	0
AOC F-4	LF262	Burial pit area	NA	F	5	0
AOC F-5	SI263	Waste disposal area	NA	F	5	0
AOC F-6	SD264	Robla Creek	NA	F	7	0
AOC G-1	LF265	Landfill area & firing range	NA	G	5	0
AOC G-2	PL266	Pol storage area	NA	G	11	1
AOC G-3	MY267	Aircraft maintenance apron	NA	G	5	0
AOC G-4	MY268	Aircraft maintenance metals/wood/auto shops	NA	G	5	0
AOC G-5	MY269	Aircraft maintenance hangar	NA	G	5	1
AOC H-1	PL270	Building 900 Gas Station	NA	H	11	1

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 7 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
AOC H-10	SS271	Former aircraft apron	NA	H	11	1
AOC H-11	DP272	Former burial pit, rad storage	NA	H	5	0
AOC H-12	SD273	Weather squadron, shop, rad or depot	NA	H	11	0
AOC H-13	SS274	Auto hobby shop	NA	H	11	0
AOC H-14	SI275	Dry impoundment area	NA	H	11	0
AOC H-2	SS276	Revetments	NA	H	12	0
AOC H-3	SS277	Revetments	NA	H	12	0
AOC H-4	SS278	Revetments	NA	H	3	0
AOC H-5	SS279	Revetments	NA	H	3	0
AOC H-6	SS280	Revetments	NA	H	3	0
AOC H-7	SS281	Revetments	NA	H	3	0
AOC H-8	PL282	POL storage area & loading facility	NA	H	11	0
AOC H-9	SS283	Stains on taxiway, battery pit	NA	H	3	1
Bldg. 600	SP284	Building 600	4	B	12	1
Bldg. 635	SS285	AeroClub	10	C	3	0
AOC 651	SS286	TCE storage and disposal area east of Bldg. 651	NA	B	5	0
CS S-049	MY287	Maintenance	3	B	12	0
Dudley Rd	WR288	rad site	NA		5	0
Free Oil Tank	TA289	Free oil separation tank for IWTP	14	C	5	1
Old Magpie Creek Channel	SD290	Former creek channel	13	C?	5	1
SA 029	TU291	Calibration shop/UST	NA	B	5	0
SA 034	SS292	Industrial electronics control	26	A	11	1
SA 039	SS293	Office and storage building	25	A	8	0
SA 050	SS294	Electrical equipment storage/warehouse	24	A	8	0
SA 063	SS295	Electronics maintenance	31	A	12	1
SA 092	TU296	UST/Laboratory	43	A	12	1
SA 102	RW297	Paint booth/washrack	31	A	12	1
SA 104	SS298	Maintenance/soil spray booth	43	A	12	0
SAFR	FR299	Small arms firing range	21	C, D	5	1
SSA 002	SS300	Special Study Area	NA	B	5	1
SSA 003	SD301	Magpie Creek off base	NA		7	0
Tank 6008	TU302	Diesel UST	10	C	3	0
Tank 701	TU303	Former diesel UST - removed	21	C	5	1
Tank 712	TU304	Abandoned diesel UST	21	C	5	0
Tank 714	TU305	Chemical and/or waste oil USTs	14	C	5	1
Tank 737	TU306		11	C	12	1
Tank 761	TU307	Diesel UST	NA	C	3	0
Tank 783	TU308	Waste fuel UST	NA	C	12	0
Tank 788	TU309	Acid neutralization sump UST	NA	C	12	0
Wastepile	DP310	Waste pile	7	B	12	1
AOC 311	WR311	Building 1080	NA	D	5	0

TABLE 3-1

**SITE SUMMARY
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 8 of 8)

Site Name	WIMS-ES	Description	IC	OU	ROD Soil	ROD GW
AOC 312	TU312	Gas Station	13	C	5	1
AOC 313	AT313	FTA	19	C	5	1
AOC 314	XU314	Former Amo Storage Area	NA	C	5	0
AOC F-1	SS315	AOC F-1	NA	F	7	0
AOC 316	SD316	Drainage Ditch	17	C	7	1
AOC 317	SD317	Don Julio Creek	NA	C	7	0
NW Taxiway	WR318	NW Taxiway	NA		5	0
Taxiway 7612	WR319	Taxiway 7612	NA		5	0

AOC - Area of Contamination

AST - above ground storage tank

Bldg - Building

BW - base well

CS - Confirmed Site

GW - groundwater

GWTP - groundwater treatment plant

IC - investigation cluster

IWL - Industrial Wastewater Line

IWTP - Industrial wastewater treatment plant

NA - not applicable

NW - northwest

OU - operable unit

PCB - polychlorinated biphenyl

PCE - tetrachloroethylene

POL - petroleum, oil and lubricants

PRL - Potential Release Location

ROD - Record of Decision

SA - Study Area

SSA - Special Study Area

TCE - trichloroethene

UST - underground storage tank

VZ - vadoze zone

WIMS-ES - Waste Information Management System - Environmental Subsystem

Source: Paul Brunner, AFRPA, August 2003.

TABLE 4-1

**GROUNDWATER CONTAMINANTS OF CONCERN AND POTENTIAL CONCERN
AND
ACTION LEVELS AND OTHER STATE GOALS/STANDARDS
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Contaminant	Groundwater Action Levels		State Drinking Water Goals (and other exposure standards)	
	µg/L	Source	µg/L	Source
Trichloroethene (TCE)	5	MCL ^{1,9,10}	0.8	CA PHG ⁵
Tetrachloroethene (PCE)	5	MCL ^{1,9,10}	0.06	CA PHG ⁵
cis-1,2-Dichloroethene (cis-1,2-DCE or DCE12C)	6	MCL ^{1,10}	6	CA MCL ⁴
1,2-Dichloroethane (1,2-DCA or DCA12)	0.5	MCL ^{1,10}	0.4	CA PHG ⁵
1,1,2-Trichloroethane (1,1,2-TCA or TCA112)	5	MCL ^{2,9,10}	0.49	CA/EPA CPF ⁶
1,1-Dichloroethene (1,1-DCE or DCE11)	6	MCL ^{2,10}	6	CA MCL ⁴
Benzene	1	MCL ^{2,10}	0.15	CA PHG ⁵
Chloroform	100	MCL ^{2,10,7}	1.1	CA/EPA CPF ⁶
Methylene Chloride (Dichloromethane)	5	MCL ^{2,9,10}	4	CA PHG ⁵
1,1-Dichloroethane (1,1-DCA or DCA11)	5	MCL ^{2,10}	5	CA MCL ⁴
Carbon Tetrachloride (CTCL)	0.5	MCL ^{2,10}	0.1	CA PHG ⁵
Vinyl Chloride	0.5	MCL ^{2,10}	0.05	CA PHG ⁵
Hexavalent Chromium	11	Aquatic Limit ^{2,3,8}	11	Aquatic Limit ⁸
1,4-Dioxane	6.1	USEPA Region 9 Tapwater PRG ^{2,3}	1.3	CA/EPA CPF ⁶

CPF - Cancer Potency Factor

MCL - maximum contaminant level

PHG - Public Health Goal

PRG - Preliminary Remediation Goal

µg/L - micrograms per liter

Sources:

¹ Source: GW OU IROD CoC, CH2M HILL, 1995

² Source: COPC from Final Technical Memorandum Off Base GWOU Phase III VOC Data Gaps Investigation, MWH, 2003b, p. 1-3

³ Source: COPC from Groundwater Monitoring Program Quarterly Report, Fourth Quarter 2002, URS, 2003g p. 3-43 and 3-44

⁴ RWQCB, 2000

⁵ California Public Health Goal (PHG) as a Drinking Water Level

⁶ Cal/EPA Cancer Potency Factor (CPF) as a Drinking Water Level

⁷ Note: USEPA Primary MCL is 80 µg/L

⁸ Based on a substantive requirement of the NPDES Permit issued by RWQCB, but not accepted by the Air Force.

⁹ USEPA MCL

¹⁰ Cal EPA MCL

TABLE 4-2

**OPERATING PARAMETERS FOR
GROUNDWATER OPERABLE UNIT TREATMENT SYSTEMS
DURING FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Descriptive Data	Groundwater Treatment Plant	IC 29 Dual Phase Extraction System	IC 23 Dual Phase Extraction System*
Treatment Technology	UV/OX and LGAC	Water: Air stripping and catalytic oxidation (at the adjacent IC 31 system) Vapor: Thermal oxidation and VGAC	LGAC and VGAC
Treatment Capacity	UV/Ox: 150 gpm LGAC: 2,250 gpm	200 gpm	20 gpm
Average Influent Flow Rate	734 gpm	97 gpm	0 gpm
Location of Treatment System	OU C1	OU A, IC 29	OU A, IC 23
Discharge Points	Magpie Creek and Beaver Pond	TGWL	Sanitary Sewer

* Offline since 30 April 2002 due to radiation levels exceeding the public allowable dose limits at the treatment system fence line. Typical average influent rate is 15 to 17 gpm.

gpm - gallons per minute

IC - Investigation Cluster

LGAC - Liquid-Phase Granular Activated Carbon

OU - operable unit

TGWL - treated groundwater line

UV/OX - Ultraviolet light and hydrogen peroxide used to pretreat flow from the extraction well field in OU D and extraction wells EW-305, EW-379, and EW-380. Currently UV/OX system is off-line

VGAC - Vapor Phase Granular Activated Carbon

Source: Installation Restoration Program Groundwater Monitoring Program, Quarterly Report, First Quarter 2003, URS, 2003I, p. 3-10 and 3-11.

TABLE 4-3

**GROUNDWATER RECOMMENDATIONS IN 1999 FIVE-YEAR REVIEW
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 2)

1999 Five Year Review Recommendation*	Actions Taken**
<p>1 Install the piezometers, monitoring wells, and extraction wells proposed in the GW OU Phase II Remedial Design Sampling and Analysis Plan and GWMP Quarterly Reports to complete definition of plume boundaries and complete capture of the on and off base plumes.</p>	<p>During Phase II, 26 monitoring wells and 58 nested piezometers were installed to further define the MCL boundaries. The monitoring wells and piezometers provide a more robust monitoring network for evaluating groundwater flow, both horizontally and vertically.</p>
<p>2 Install the monitoring wells east of OU A as planned to address the data gap in defining the plume extent near MW-1067. If sample results indicate that TCE or other contaminant concentrations exceeding the MCL are likely to reach Northridge Water District production well NW-17, notify the district that samples should be collected for analysis, and if necessary, the well should be taken off line to prevent exposure. If the production wells at the two mobile home parks are threatened, notify the County so that appropriate action can be taken.</p>	<p>Action taken in response to recommendations from 1999 McClellan Five-Year Review Report. Additional monitoring wells or piezometers were installed near the Eleven Oaks Mobile Home Park and at the base boundary during the Phase III Data Gaps Investigation. Results of the Phase III Data Gap Investigation (MWH, 2003b) indicate that 1) McClellan does not appear to be the source of the 1,1-DCA contamination in the mobile home park wells and Sacramento Suburban well and 2) there maybe an A-zone connection between McClellan and offbase detections of carbon tetrachloride. East plume boundary near MW 1067 defined. Samples from NW-17 revealed that contamination from McClellan has not reached the well. McClellan performs ongoing review of Sac Suburban data.</p>
<p>3 Implement actions to address newly identified areas of contamination upon completion of the remaining RIs and data gaps identified in the GWMP during Phase 3 of the groundwater remedy implementation. The Phase 3 groundwater remedy is scheduled to be complete in early 2001.</p>	<p>Additional monitoring wells have been installed and evaluated during Phase III Data Gaps to address the areas of contamination prior to installation of Phase III extraction systems. The off-base portion of Phase III is scheduled for design/construction in 2003/2004 and the on-base portion of Phase III is scheduled for design/construction in 2004/2005. As new data gaps are identified, McClellan is programming for the installation of additional monitoring wells, as needed.</p>

TABLE 4-3

**GROUNDWATER RECOMMENDATIONS IN 1999 FIVE-YEAR REVIEW
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 2)

1999 Five Year Review Recommendation*	Actions Taken**
4 Prior to base closure in 2001, develop an institutional control monitoring plan, procedures, and checklists to ensure that the long-term protectiveness of these controls will be assured. Arrange for responsibilities delineated under the plan to be transferred upon lease, property transfer, and/or base closure.	See Section 12 for description of land use controls and institutional controls being applied at McClellan.
5 Continue well abandonment to destroy wells that have gone dry or are no longer needed for monitoring or groundwater extraction because this will prevent their functioning as conduits for contamination.	Wells were abandoned during Phase 2 activities and well abandonment has resumed again in 2003, as part of the groundwater monitoring program. Well abandonment needs to continue to be identified in groundwater monitoring program quarterly reports.

* Source: Final Five Year Review Report, Radian International, 1999A, p. 47

** Source: Final GWOU Phase III Work Plan, CH2M Hill, March 2002A, p. 2-8 and 2-9 for actions taken to 1,3, and 5.

DCA - dichloroethane

GWOU - groundwater operable unit

GWMP - Groundwater Monitoring Program

MCL - maximum contaminant level

MWH - MWH Americas, Inc.

RI - remedial investigation

TCE - trichloroethene

TABLE 4-4

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
GROUNDWATER OPERABLE UNIT
FIVE-YEAR REVIEW
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA**

(Page 1 of 4)

Remedial Action Objective*	Action Taken to Meet Objective**	Performance and Progress Toward Goals	Recommendations
<p>1 Protect public health and the environment from exposure to contaminated groundwater.</p>	<p>Base wells were decommissioned and are no longer used for drinking water except for BW-10, which is operated by Sac Suburban, and BW-23 which is inactive. An FSP to install guard wells at BW-10 has been completed, and the AF will install guard wells in accordance with the FSP. The AF is investigating the condition of BW-23 and the possibility of using it as a monitoring well. If unusable, it will be decommissioned. Communities surrounding the base are using public water supplies. Owners of private water wells near the base were given the option of having the Air Force abandon the well or to keep the well for irrigation purposes; however, the well was no longer to be used for drinking water.</p> <p>A time critical removal action (TCRA) resulted from hexavalent chromium contamination found in the GWTP effluent. Since the detection may be background, a background investigation will be carried out. Monthly hexavalent chromium sampling at the Groundwater Treatment Plant and Magpie Creek is ongoing.</p> <p>A study was conducted of the UV/OX treatment system to verify the UV/OX was a viable treatment method for 1,4-dioxane contamination found in the GWTP effluent.</p>	<p>Phase III Data Gap investigation includes the addition of a number of off-base monitoring locations to satisfy the data gaps. Following this investigation, the plumes will be better defined.</p> <p>Interim remedial actions consist of shutting off extraction wells to decrease the concentration of hexavalent chromium discharged in the GWTP effluent, and diverting GWTP effluent to the sanitary sewer system when above discharge limits. The interim remedy under the TCRA, installation of an ion exchange system at the GWTP, was accomplished in June 2003, and the interim remedy is in proveout.</p> <p>No conclusion has been reached for treating 1,4-dioxane contamination in the GWTP effluent.</p>	<p>Continue to monitor locations off base near public drinking water wells.</p> <p>The ion exchange system has been installed and proved out at the GWTP to ensure that hexavalent chromium concentrations in the GWTP effluent are within the required discharge limits.</p> <p>Potential treatment options should be pursued in a RI/FS for 1,4-dioxane in the GWTP effluent.</p>

TABLE 4-4

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
GROUNDWATER OPERABLE UNIT
FIVE-YEAR REVIEW
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA**

(Page 2 of 4)

Remedial Action Objective*	Action Taken to Meet Objective**	Performance and Progress Toward Goals	Recommendations
<p>2 Contain the groundwater contamination by stopping lateral migration off-base and vertical migration to deeper aquifers.</p>	<p>Phases I and II- Extraction Wells - Fifteen extraction wells were installed during Phase 1. Containment of the hot spot in OU A Northern and the hot spot in OU C was achieved.</p> <p>Monitoring Wells and Piezometers - Thirty-nine monitoring wells and 15 nested piezometers were installed to further refine MCL boundaries and improve the monitoring network for evaluating groundwater flow. Groundwater level and concentration data collected from these systems have allowed the performance of the pump-and-treat system to be evaluated.</p> <p>Treatment Capacity - The GWTP was upgraded to improve its operating efficiency by installing an UV/OX system to pretreat the OU D flows, followed by LGAC. The heated air stripper and it's offgas treatment were taken offline to reduce labor costs. The effluent from the GWTP was discharged to Magpie Creek (CH2M Hill, 2002a, p. 2-8).</p>	<p>The Phase II system was forecasted to hydraulically capture most contamination in Monitoring Zone A. However, the areas that are not captured include OU G and OU H contamination, the southern tip of OU C VOC plume near the GWTP, and the southern portions of the OU A VOC plumes. In Monitoring Zone B, hydraulic capture of VOC contamination above MCLs is nearly complete with the exception of the western and southern portions of the southern OU A plume, the southwest off-base VOC plume, and the VOC plumes in OUs G and H. All VOC compounds at concentrations above MCLs in Monitoring Zone C are estimated to be hydraulically captured (CH2M Hill, 2002, p. 2-9)</p>	<p>Implement the full data gap program and extraction well placement outlined in the Phase III Work Plan. In addition, the model should be updated to include the new data gap information so that a complete picture of the plumes may be obtained.</p>

TABLE 4-4

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
GROUNDWATER OPERABLE UNIT
FIVE-YEAR REVIEW
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA**

(Page 3 of 4)

Remedial Action Objective*	Action Taken to Meet Objective**	Performance and Progress Toward Goals	Recommendations
2 (cont.)	<p>Phase II -</p> <p>Extraction Wells - Twenty-two new extraction wells were installed during Phase II.</p> <p>Monitoring Wells and Piezometers - Twenty-six monitoring wells and 58 nested piezometers were installed to further refine MCL boundaries.</p> <p>Treatment Capacity - The GWTP was modified with the addition of a new influent tank and 2,000 gpm air stripper. A portion of the flow is pretreated by the UV/OX system and then mixed with the remaining influent before it is treated by the air stripper, polished by LGAC, and then discharged to Magpie Creek. The air exhausted from the air stripper is treated through the use of a zeolite concentrator and an Alzeta flameless oxidation unit. Wellhead LGAC units on the east side of the base installed during Phase I were dismantled, and the flow from extraction wells was directed to the GWTP.</p> <p>Operations - Both the GWTP and the IC 29 pretreatment facility are operating as a result of the Phase II implementation (CH2M Hill, 2002a).</p>		

TABLE 4-4

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
GROUNDWATER OPERABLE UNIT
FIVE-YEAR REVIEW
FORMER McCLELLAN AFB
SACRAMENTO, CALIFORNIA**

(Page 4 of 4)

Remedial Action Objective*		Action Taken to Meet Objective**	Performance and Progress Toward Goals	Recommendations
		Phase III - Data Gaps Investigation - off-base data gaps completed and on-based data gaps started.	Defined horizontal and vertical extent of groundwater plumes that extend off-base.	Continue completion of on-base data gaps. After the data gaps are completed, the data should be input into the groundwater model to assist extraction well placement and design, rather than relying on the initial locations provided in the Phase III Work Plan.
		Expansion of GWTP - In 2000, two additional granular activated carbon units were installed at the GWTP to increase the treatment capacity to 2,250 gpm.		
3	Achieve compliance with ARARs.	The selected response actions comply with federal and state requirements that are legally applicable, or relevant and appropriate.	Goal achieved.	None.

* Source: Basewide Groundwater Operable Unit Interim Record of Decision, CH2M Hill, 1995, p. 21

**CH2M Hill, 2002a - Final GWOU Phase III Work Plan, March, p. 2-7 and 2-8

ARAR - applicable or relevant and appropriate requirements

FSP - Field Sampling Plan

gpm - gallons per minute

GWTP - Groundwater Treatment Plant

IC - Investigation Cluster

LGAC - Liquid Granular Activated Carbon

MCL- maximum contaminant level

OU - operable unit

PA/SI/RI - Preliminary Assessment/Site Investigation/Remedial Investigation

TCRA - Time Critical Removal Action

UV/Ox - Ultraviolet/Oxidation

VOC - volatile organic compound

TABLE 4-5

**GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 5)

Plume	Monitoring Zone	Status as of First Quarter 2003*	Recommendations*
OU A	A	The OU A Northern and Central target area, which is the larger of the two target areas, has not been defined to the west and is partially defined to the east. Groundwater flow paths interpreted from elevation contours suggest that most of the northern portion of this target area is captured.	The Phase III Work Plan recommends the installation of a number of extraction wells and monitoring wells to define the western extent of the plume. The GWOU VOC Data Gaps Investigation (MWH, 2003b) is scheduled to fill those gaps by November 2003.
OU A	A	The OU A Southern target area was mostly captured by EW-301 and EW-302. The western portion of this target area is not defined.	The Phase III Work Plan recommends the installation of a number of extraction wells and monitoring wells to define the western extent of the plume. The extent of the TCE contamination in the A zone is defined to the east and Phase 3 Data Gaps Investigation is defining this plume to the south and southwest.
OU A	B	The OU A Northern TCE MCL target area is mostly defined to the west, a small portion of the east, and part of the southern boundary. Interpreted groundwater flow based on 1Q03 data suggests that this target area was partially captured by EW-297, EW-336, and the DPE system.	The Phase III Work Plan recommends the installation of a number of extraction wells and monitoring wells to define the western extent of the plume. The Phase III Data Gaps Investigation is defining this plume in the A, B, and C monitoring zones.
OU A	B	The TCE MCL target area in central OU A has not been fully defined to the east, north, or west. Interpreted groundwater flow suggests that the estimated extent of the target area was partially captured in 1Q03 by EW-340.	The Phase III Work Plan recommends the installation of a number of extraction wells and monitoring wells to define the eastern, northern, and western extent of the plume.

TABLE 4-5

**GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 5)

Monitoring		Status as of First Quarter 2003*	Recommendations*
Plume	Zone		
OU A	B	In the southern OU A, the TCE MCL target area indicated only by concentrations in the AB zone extraction wells is not defined to the southeast or west and its presence is questionable. Based on groundwater elevations, the target area may not have been captured in 1Q03.	The Phase III Work Plan recommends collection of hydropunch samples to define the southern extent of the plume. Phase III Data Gaps Investigation has installed monitoring wells in monitoring zones A, B, and C to better define the <u>MCL target volumes</u> .
OU B/ OU C	A	Groundwater flow paths interpreted from elevation contours suggest that during 1Q03 the larger TCE MCL target area was completely captured in OU B by six A zone extraction wells and two AB zone extraction wells and in southern OU C by five A zone extraction wells and two AB zone wells. The hot spot of this plume was completely captured.	TCE concentrations have increased in EW-284 (OU B at the base boundary) to greater than MCL since the original pump failed in 1Q00. An extraction pump will be installed in April 2003; however, the well will not be reactivated until the hexavalent chromium treatment system comes on line in June 2003 and has proved out.
OU B/ OU C	A	Capture of the smaller, downgradient extent of the OU B/OU C plume is apparent, even though several extraction wells were shut down to reduce hexavalent chromium concentrations in the groundwater treatment plant effluent.	The Phase III Work Plan recommends the installation of several A zone extraction wells in and near the OU C northern plume.
OU B/ OU C	A	A smaller TCE target area in the northern portion of OU C is undefined to the west/northwest. The estimated extent of the target area was captured by EW-379 and EW-380.	The Phase III Work Plan recommends the installation of several A zone extraction wells in and near the OU C northern plume.

TABLE 4-5

**GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 5)

Monitoring		Status as of First Quarter 2003*	Recommendations*
Plume	Zone		
OU B/ OU C	B	Groundwater flow lines indicate that the OU B/OU C TCE MCL target area was completely captured in OU B by two AB zone extraction wells, three B zone extraction wells, one BC Zone extraction well, and in OU C by EW-144.	EW-310 and EW-366 were shut down on 29 January 2002 to reduce hexavalent chromium concentrations at the GWTP. Capture is still apparent as of 4Q02. The Phase III Work Plan recommends installation of two B zone extraction wells, the conversion of EW-284 from a monitoring well to an extraction well, and the sampling of existing piezometers to monitor concentrations changes in the hot spot area.
OU B/ OU C	C	Two TCE MCL target areas were identified in the OU B/OU C. The larger area has not been defined to the west of north. The estimated extent of contamination is completely captured.	EW-141 and EW-307 were shut down on 29 January 2002 to reduce the hexavalent chromium concentrations at the GWTP. Capture is still apparent as of 4Q02.
OU B/ OU C	D	Because sampling results from 3Q98 through 1Q02 did not indicate any target areas in the D monitoring zone, it was decided that extraction of groundwater by EW-309 in OU B was no longer needed. EW-309 was turned off in December 2001 as agreed at the BCT meeting in November 2001.	Continue to sample EW-309 and nearby monitoring wells.
OU D	A	The TCE target area was completely captured by the operation of three OU D extraction wells.	EW-86 was shut down on 29 January 2002 to reduce the hexavalent chromium concentrations at the GWTP; however, capture is still apparent.
OU D	B	The estimated TCE MCL target area in the B monitoring zone, indicated only by AB zone extraction wells, was completely captured.	EW-86 was shut down on 29 January 2002 to reduce the hexavalent chromium concentrations at the GWTP; however, capture is still apparent.
OU E	A	There are no TCE target areas.	None

TABLE 4-5

**GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 4 of 5)

Monitoring		Status as of First Quarter 2003*	Recommendations*
Plume	Zone		
OU F	B	There are no TCE target areas.	None
	A	There are no TCE target areas.	None
	B	There are no TCE target areas.	None
OU G	A	Two TCE MCL target areas were not captured because there are no extraction wells in this OU. One target area was centered on MW-395 and one on MW-393.	Phase III Work Plan recommends hydropunch sampling to define vertical and lateral extent. Final monitoring wells will also be installed and a long-term aquifer test will be performed to obtain information on aquifer parameters in OU G.
OU G	B	A TCE target area and hot spot is centered on MW-424. There are no extraction wells in OU G; therefore, the target area and hot spot were not captured. In addition, the lateral and vertical extents of the target area are not defined.	The Phase III Work Plan recommends four AB zone extraction wells and two B zone extraction wells. In addition, the Phase III Data Gaps Investigation will be defining MCL target volume boundaries for monitoring zones A, AB, B, and C.
OU H	A	Three TCE MCL target areas were identified. One of the target areas was centered on MW-400, another was centered on MW-429, and the third was located on the OU H/OU A boundary. The target area around EW-333 is undefined to the southwest and northeast. The lateral and vertical extents of the target areas around MW-400 and MW-429 are not defined. There were no operating extraction wells in OU H; therefore these contaminant plumes are not captured.	Phase III Work Plan recommends hydropunch sampling east of EW-333 in the A and B monitoring zones and southwest of EW-333 in the A, B, and C monitoring zones to define the vertical and lateral extent of contamination. Seven extraction wells are proposed in the AB zone in OU H and EW-333 is proposed to be brought on line.

TABLE 4-5

**GROUNDWATER PLUME STATUS
AS OF FIRST QUARTER 2003
FIVE YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 5 of 5)

Plume	Monitoring Zone	Status as of First Quarter 2003*	Recommendations*
OU H	B	A TCE MCL target area surrounds EW-333, which is screened in the A and B monitoring zones and is used as a monitoring well. There are no operating extraction wells in OU H; therefore, the target area was not captured. The lateral and vertical extent of the target areas are not defined to the east or west.	Phase III Work Plan recommends hydropunch sampling east of EW-333 in the A and B monitoring zones and southwest of EW-333 in the A, B, and C monitoring zones to define the vertical and lateral extent of contamination. Seven extraction wells are proposed in the AB zone in OU H and EW-333 is proposed to be brought on line.
Off Base	B	The TCE MCL target area at MW-1050 (southwest of OU B) no longer exists as the TCE concentration decreased in 2Q02 to less than MCL. In 4Q02, the TCE concentration in samples from MW-1050 were again less than MCL.	Continue to sample MW-1050.

1Q03 - First Quarter 2003

BCT - Base Realignment and Closure Cleanup Team

DPE - Dual Phase Extraction

GWOU - groundwater operable unit

GWTP - Groundwater Treatment Plant

MCL - Maximum Contaminant Level

MWH - MWH Americas, Inc.

OU - operable unit

TCE - trichloroethene

VOC - volatile organic compound

* Source: Modified from URS, 2003l, p. 3-17 through 3-30 First Quarter 2003 Report

TABLE 5-1

**VADOSE ZONE TREATMENT SYSTEMS SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 3)

OU	SVE RA Areas	Treatment System	Total SVE/DPE/SVM Wells	Current SVE/DPE/SVM Wells (During System Operation)	Extraction Interval (feet bgs)	System Startup Date	Comments
A	IC-23	IC-23 VGAC/LGAC Dual-Phase	1/1/17	1/1/17	20-144	Jul-97	Initial STOP reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 4th Qtr 2001 data. System restarted in April 2003.
A	IC-25	IC-25/27 VGAC	1/0/3	1/0/3	20-105	Mar-01	Initial STOP reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 4th Qtr 2001 data. System shutdown for rebound test in second quarter 2003.
A	IC-27	IC-25/27 VGAC	1/0/15	1/0/15	20-115	Jan-99	Interim STOP was reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 3rd Qtr 2002 data. On hold pending SSG risk assessment issues. System shutdown for rebound test during second quarter 2003.
A	IC-29	IC-29/30/31/32 CatOx	3/6/23	3/0/23	19-95	Jan-98	Initial STOP recommended in 1st Qtr 2003 Vadose Zone Monitoring Report.
A	IC-30	IC-29/30/31/32 CatOx	1/0/10	1/0/10	20-100	Aug-00	None
A	IC-31	IC-29/30/31/32 CatOx	9/0/24	1/0/24	20-90	Sep-96	None
A	IC-32	IC-29/30/31/32 CatOx	2/0/3	1/0/3	20-100	Aug-00	None
A	IC-34	IC-34/35/37 VGAC/FTO	1/0/8	1/0/8	20-105	May-00	None
A	IC-35	IC-34/35/37 VGAC/FTO	3/2/18	2/0/18	20-135	Oct-99	None
A	IC-37	IC-34/35/37 VGAC/FTO	2/0/39	2/0/39	20-105	May-00	None

TABLE 5-1

**VADOSE ZONE TREATMENT SYSTEMS SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 3)

OU	SVE RA Areas	Treatment System	Total SVE/DPE/SVM Wells	Current SVE/DPE/SVM Wells (During System Operation)	Extraction Interval (feet bgs)	System Startup Date	Comments
A	IC-41	IC-41/42/43 VGAC/FTO	1/0/9	1/0/9	20-105	Jul-00	Initial STOP reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 4th Qtr 2001 data.
A	IC-42	IC-41/42/43 VGAC/FTO	2/0/14	2/0/14	20-105	Jul-00	None
A	IC-43	IC-41/42/43 VGAC/FTO	1/0/9	1/0/9	20-105	Jul-00	None
B	IC-1	IC-1 VGAC	8/2/60	2/2/60	8-145	Sep-96	Initial STOP reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 3rd Qtr 2002 data.
B	IC-5	IC-5/7 VGAC	2/0/15	2/0/15	20-105	Jul-01	System shutdown for rebound test during second quarter 2003.
B	IC-7	IC-5/7 VGAC	7/0/42	1/0/42	20-100	Feb-95	Interim STOP was reported in 4th Qtr 2002 Vadose Zone Monitoring Report and based on 4th Qtr 2001 data. System shutdown for rebound test during second quarter 2003.
B	PRLS-13	PRLS-13 FTO	1/0/22	1/0/22	20-105	Jul-01	Initial STOP was recommended 1st Qtr 2003 Vadose Zone Monitoring Report. System moved to SSA-2. Rebound test being carried out.
B	SSA-2	SSA-2 Portable FTO	3/0/14	3/0/14	20-105	Sep-01	None
C	IC-19	ODU/IC-19 CatOx	2/2/29	2/2/29	10-132	Jun-97	None
C	OU C1	OUC-1/PRL-66B CatOx	9/0/29	4/0/29	25-90	Jul-95	None

TABLE 5-1

**VADOSE ZONE TREATMENT SYSTEMS SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 3)

OU	SVE RA Areas	Treatment System	Total SVE/DPE/SVM Wells	Current SVE/DPE/SVM Wells (During System Operation)	Extraction Interval (feet bgs)	System Startup Date	Comments
C	PRL-66B	OUC-1/PRL-66B CatOx	1/0/21	1/0/21	17-97	May-01	None
D	ODD	ODD/IC-19 CatOx	31/0/80	5/0/80	15-100	Jul-96	None
G	PRLT-44	PRLT-44 VGAC	2/0/15	2/0/15	15-105	Mar-99	None

bgs - below ground surface
 CatOx - Catalytic Oxidation
 DPE - Dual Phase Extraction
 FTO - Flameless Thermal Oxidizer
 IC - Investigation Cluster

OU - operable unit
 RA - removal action
 SVE - Soil Vapor Extraction
 SVM - Soil Vapor Monitoring
 VGAC - Vapor Granular Activated Carbon

Source: Soil Vapor Extraction Operations and Maintenance Monthly Operations/Status Report for June 2003, URS, 2003n.
 Quarterly Vadose Zone Monitoring Report April-June, 2003, URS, 2003r.

TABLE 5-2

**VADOSE ZONE TREATMENT SYSTEMS OPERATIONAL SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 3)

OU	SVE RA Areas	Treatment System	Primary VOCs	Original Mass Estimates (lbs)	Cummulative VOC Mass Removed* (lbs)	Est. Mass Removed 2nd Qtr 2003 (lbs)	Up-Time Oper. Efficiency 2nd Qtr 2003 (%)
A	IC-23	IC-23 VGAC/LGAC Dual-Phase	Total VOCs	2,200-3,200	4,028	40	92
			TCE	547-906	NA	0	
			1,1-DCE	1,164-1,488	NA	0	
			1,1,1-TCA	462-719	NA	0	
A	IC-25	IC-25/27 VGAC	Total VOCs	60	39	0	0
			TCE	40	15	0	
A	IC-27	IC-25/27 VGAC	Total VOCs	300	572	0	0
			TCE	184	308	0	
			CTCL	92	36	0	
A	IC-29	IC-29/30/31/32 CatOx	Total VOCs	600	517	4	98
			TCE	353-585	336	3	
A	IC-30	IC-29/30/31/32 CatOx	Total VOCs	250	93	10	47
A	IC-31	IC-29/30/31/32 CatOx	Total VOCs	2,600-4,200	6,239	9	99
			TCE	2,285-3,782	3,268	6	
			1,1-DCE	273-349	585	0	
A	IC-32	IC-29/30/31/32 CatOx	Total HVOCs	55	7	3	99
			BTEX	650	1,113	22	
A	IC-34	IC-34/35/37 VGAC/FTO	Total VOCs	110	22	2	100
			TCE	20	10	1	
			BTEX	90	8	0	
A	IC-35	IC-34/35/37 VGAC/FTO	Total VOCs	1,000	1,593	33	100
			TCE	770	1,289	28	
			CTCL	195	116	0	
A	IC-37	IC-34/35/37 VGAC/FTO	Total VOCs Total	3,100	15,530	303	80
			HVOCs	2,500	13,712	231	
			BTEX	600	1,818	72	

TABLE 5-2

**VADOSE ZONE TREATMENT SYSTEMS OPERATIONAL SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 3)

OU	SVE RA Areas	Treatment System	Primary VOCs	Original Mass Estimates (lbs)	Cummulative VOC Mass Removed* (lbs)	Est. Mass Removed 2nd Qtr 2003 (lbs)	Up-Time Oper. Efficiency 2nd Qtr 2003 (%)
A	IC-41	IC-41/42/43 VGAC/FTO	Total VOCs TCE	12 12	61 50	1 0	50
A	IC-42	IC-41/42/43 VGAC/FTO	Total VOCs	320	656	20	96
A	IC-43	IC-41/42/43 VGAC/FTO	Total VOCs PCE BZME	720 20 700	1,744 39 1,322	39 1 2	100
B	IC-1	IC-1 VGAC	Total VOCs TCE PCE	3,100-5,500 2,000-3,400 1,100-2,100	8,424 2,166 4,919	31 5 23	92
B	IC-5	IC-5/7 VGAC	Total VOCs TCE 1,1-DCE	80 32 45	113 63 20	0 0 0	1.5
B	IC-7	IC-5/7 VGAC	Total VOCs TCE PCE	3,000-5,600 2,154-3,565 778-1,437	10,039 6,729 2,663	0 0 0	1.5
B	PRLS-13	PRLS-13 FTO	Total VOCs TCE	140 140	257 101	0 0	0
B	SSA-2	SSA-2 Portable FTO	Total VOCs PCE	16 16	121 36	76 15	93
C	IC-19	ODU/IC-19 CatOx	Total VOCs TCE cis-1,2-DCE PCE 1,1-DCE VC	3,665-5,753 1,900-3,079 703-1,165 278-513 586-749 198-247	16,405 4,570 4,584 1,776 3,539 666	170 27 54 52 17 0	96
C	OUC-1	OUC-1/PRL-66B CatOx	Total VOCs TCE cis-1,2-DCE	4,100-8,700 3,137-6,872 917-1,803	23,973 15,531 1,086	177 127 29	99

TABLE 5-2

**VADOSE ZONE TREATMENT SYSTEMS OPERATIONAL SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 3)

OU	SVE RA Areas	Treatment System	Primary VOCs	Original Mass Estimates (lbs)	Cummulative VOC Mass Removed* (lbs)	Est. Mass Removed 2nd Qtr 2003 (lbs)	Up-Time Oper. Efficiency 2nd Qtr 2003 (%)
C	PRL-66B	OUC-1/PRL-66B CatOx	Total VOCs TCE	140 140	260 253	8 7	99
D	ODD	ODD/IC-19 CatOx	Total VOCs	105,200- 2,153,100	439,950	384	96
G	PRLT-44	PRLT-44 VGAC	Total VOCs TCE cis-1,2-DCE PCE	3,400-5,600 3,300-5,400 54-100 26-41	4,910 3,735 36 293	8 5 0 2	98

BEN - benzene

BTEX - benzene, toluene, ethylbenzene, and xylene

CatOx - catalytic oxidation

CTCL - carbon tetrachloride

DCE - dichloroethene

FTO - flameless thermal oxidizer

IC - Investigation Cluster

lbs - pounds

lbs/day - pounds per day

LGAC - liquid granular activated carbon

OU - operable unit

PCE - tetrachloroethene

ppmv - parts per million by volume

RA - removal action

scfm - standard cubic feet per minute

TCA - trichloroethane

TCE - trichloroethene

TOL - toluene (BZME)

VC - vinyl chloride

VGAC - vapor granular activated carbon

VOC - volatile organic compound

Source: Quarterly Vadoze Zone Monitoring Report, April - June 2003, URS, 2003r.

* - Cumulative Mass Removed through the 2nd quarter 2003.

TABLE 5-3

**PRELIMINARY CLEANUP GOALS FOR VOLATILE ORGANIC COMPOUNDS
IN SHALLOW¹ SOIL GAS AND EQUILIBRIUM
SOIL GAS CONCENTRATIONS EQUIVALENT TO MAXIMUM CONTAMINANT LEVELS
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Chemical VOC	Residential Scenario Screening Level (ppmv)	Industrial Scenario Screening Level (ppmv)	Groundwater MCL (µg/L)	Equilibrium Soil Gas Concentration Equivalent to MCL ² (ppmv)
1,1-Dichloroethane	2.3	28	5	0.216
1,1-Dichloroethene	0.13	1.3	6	1.273
1,2-Dichloroethane	0.07	1.2	0.5	0.005
1,4-Dichlorobenzene	0.11	1.9	5	0.052
Acetone	160	6,300	NA	NA
Benzene	0.15	1.9	1	0.073
Carbon tetrachloride	0.09	0.96	0.5	0.075
Chlorobenzene	11	230	70	2.1
Chloroform	0.43	5.9	100	2.303
cis-1,2-Dichloroethene	28	540	6	0.183
Methylene chloride	2.9	42	5	0.147
Tetrachloroethene	0.5	5.5	5	0.395
Trichloroethene	1.1	12	5	0.272
Toluene	310	6,300	150	9.574
trans-1,2-Dichloroethene	78	1,300	10	0.743
Vinyl chloride	0.13	1.3	0.5	0.173
Freon [®] 113	NA	NA	1,200	2,839
1,2-Dichlorobenzene	NA	NA	600	4.902
1,2-Dichloropropane	NA	NA	5	0.093
1,2,4-Trichlorobenzene	NA	NA	70	0.707
1,1,1-Trichloroethane	NA	NA	200	19.78
1,1,2-Trichloroethane	NA	NA	5	0.028
Ethylbenzene	NA	NA	700	51.27
Styrene	NA	NA	100	2.7
Freon [®] 11	NA	NA	150	108.02
Total Xylenes	NA	NA	1,750	129.03

MCL - maximum contaminant level

NA - not applicable, no MCL established, or no shallow soil gas screening level established

ppmv - parts per million by volume

VOC - volatile organic compound

µg/L - micrograms per liter

Source: Shallow soil gas screening values from McClellan VOC FS [CH2M Hill, 1999] and GWOU/VOC ROD Phase 3 Workplan [CH2M Hill 2000]

Quarterly Vadose Zone Monitoring Report, First Quarter 2003, URS, 2003m.

¹ Upper ten feet below ground surface, assumes 10⁻⁶ risk level.

² Calculated using Henry's Constants from the Remedial Investigation General Framework Document (URS, 2002f) and other sources.

TABLE 5-4

**VADOSE ZONE TREATMENT SYSTEMS COMPLIANCE
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 3)

OU	SVE RA Areas	Treatment System	Extraction Rates* (lbs/day)	Average System Flow Rates* (scfm)	Emission Rates* (lbs/day)	Primary Constituents	Preliminary Vadose Zone Clean-Up Goals (ppmv)	Influent VOC Contaminant Concentrations* (ppmv)
A	IC-23	IC-23 VGAC	0.2	150-190	0.002	Total VOCs TCE 1,1-DCE 1,1,1-TCA	0.272 1.273 19.78	2.6
A	IC-25	IC-25/27 VGAC	0	0	0	Total VOCs TCE	0.272	NA
A	IC-27	IC-25/27 VGAC	0	0	0	Total VOCs TCE CTCL	0.272 0.075	NA
A	IC-29	IC-29/30/31/32 CatOx	7.2	530-540	0.08	Total VOCs TCE	0.272	36
A	IC-30	IC-29/30/31/32 CatOx	7.2	530-540	0.08	Total VOCs		36
A	IC-31	IC-29/30/31/32 CatOx	7.2	530-540	0.08	Total VOCs TCE 1,1-DCE	0.272 0.183	36
A	IC-32	IC-29/30/31/32 CatOx	7.2	530-540	0.08	Total HVOCs BEN	0.073	36
A	IC-34	IC-34/35/37 VGAC FTO	0.3 182.3	280-300 270-280	0 0.003	Total VOCs TCE BEN	0.272 0.073	2.2
A	IC-35	IC-34/35/37 VGAC FTO	0.3 182.3	280-300 270-280	0 0.003	Total VOCs TCE CTCL	0.272 0.075	2.2
A	IC-37	IC-34/35/37 VGAC FTO	0.3 182.3	280-300 270-280	0 0.003	Total VOCs BEN	0.073	2.2
A	IC-41	IC-41/42/43 VGAC FTO	0.4 1.2	250-260 230-240	0.001 0.12	Total VOCs TCE	0.272	2.54

TABLE 5-4

**VADOSE ZONE TREATMENT SYSTEMS COMPLIANCE
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 3)

OU	SVE RA Areas	Treatment System	Extraction Rates* (lbs/day)	Average System Flow Rates* (scfm)	Emission Rates* (lbs/day)	Primary Constituents	Preliminary Vadose Zone Clean-Up Goals (ppmv)	Influent VOC Contaminant Concentrations* (ppmv)
A	IC-42	IC-41/42/43 VGAC FTO	0.4 1.2	250-260 230-240	0.001 0.012	Total VOCs		2.54
A	IC-43	IC-41/42/43 VGAC FTO	0.4 1.2	250-260 230-240	0.001 0.012	Total VOCs PCE TOL	0.395 9.574	2.54
B	IC-1	IC-1 VGAC	0.4	480-55	0	Total VOCs TCE PCE	0.272 0.395	1.4
B	IC-5	IC-5/7 VGAC	0	0	0	Total VOCs TCE 1,1-DCE	0.272 1.273	NA
B	IC-7	IC-5/7 VGAC	0	0	0	Total VOCs TCE PCE	0.272 0.395	NA
B	PRLS-13	PRLS-13 FTO	0	0	0	Total VOCs TCE	0.272	NA
B	SSA-2	SSA-2 Portable FTO	0.5	210-240	0	Total VOCs PCE	0.395	4.66
C	IC-19	OUD/IC-19 CatOx	16.7	470-540	0.39	Total VOCs TCE cis-1,2-DCE PCE 1,1-DCE VOC	0.272 0.183 0.395 1.273 0.173	88.5
C	OUC-1	OUC-1/PRL-66B CatOx	93.8	380-410	2.4	Total VOCs TCE cis-1,2-DCE	0.272 0.183	403.2
C	PRL-66B	OUC-1/PRL-66B CatOx	93.8	380-410	2.4	Total VOCs TCE	0.272	403.2

TABLE 5-4

**VADOSE ZONE TREATMENT SYSTEMS COMPLIANCE
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 3)

OU	SVE RA Areas	Treatment System	Extraction Rates* (lbs/day)	Average System Flow Rates* (scfm)	Emission Rates* (lbs/day)	Primary Constituents	Preliminary Vadose Zone Clean-Up Goals (ppmv)	Influent VOC Contaminant Concentrations*
D	ODD	ODD/IC-19 CatOx	16.7	470-540	0.39	Total VOCs		88.5
G	PRLT-44	PRLT-44 VGAC	0.1	230-240	0		0.272 0.183 0.395	0.72

BEN - benzene

CatOx - catalytic oxidation

CTCL - carbon tetrachloride

DCE - dichloroethene

FTO - flameless thermal oxidizer

IC - Investigation Cluster

lbs/day - pounds per day

OU - operable unit

PCE - tetrachloroethene

ppmv - parts per million by volume

scfm - standard cubic feet per minute

TCA - trichloroethane

TCE - trichloroethene

TOL - toluene

VC - vinyl chloride

VGAC - vapor granular activated carbon

VOC - volatile organic compound

*Source: Soil Vapor Extraction Operations and Maintenance Monthly Operations/Status Report for June 2003, URS, 2003n.

TABLE 5-5

**PRELIMINARY SOIL GAS SCREENING RAO ASSESSMENT
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Contaminant	Preliminary Screening Level		Screening Indoor Air Concentration		Inhalation Toxicity Criteria			Residential Risk/Hazard			Industrial Risk/Hazard		
	Residential	Industrial	Resident	Industrial	CSF		RfC	Cal/EPA	EPA	EPA	Cal/EPA	EPA	EPA
					(mg/kg-d) ¹		(mg/m ³)						
	(ppmv)	(ppmv)	ug/m ³	ug/m ³				Risk	Risk	HI	Risk	Risk	HI
1,1-Dichloroethane	2.3	28	26.9	8.6	6 E-3	NA	5 E-1	2 E-5	NA	0.0527	3 E-6	NA	0.012
1,1-Dichloroethene	0.13	1.3	1.5	0.4	NA	NA	2 E-1	NA	NA	0.0073	NA	NA	0.001
1,2- Dichloroethane	0.07	1.2	0.8	0.4	7 E-2	9 E-2	5 E-3	7 E-6	9 E-6	0.16	2 E-6	2 E-6	0.051
1,4-dichlorobenzene	0.11	1.9	1.9	0.9	4 E-2	2 E-2	8 E-1	9 E-6	5 E-6	0.0023	2 E-6	1 E-6	0.001
Acetone	160	6300	1126	1135	NA	NA	4 E-1	NA	NA	3.1	NA	NA	2.2
Benzene	0.15	1.9	1.4	0.5	1 E-1	3 E-2	3 E-2	2 E-5	4 E-6	0.0446	3 E-6	9 E-7	0.010
Carbon tetrachloride	0.09	0.96	1.6	0.5	2 E-1	5 E-2	2 E-3	3 E-5	1 E-5	0.642	5 E-6	2 E-6	0.128
Chlorobenzene	11	230	146.4	80.1	NA	NA	7 E-2	NA	NA	2.0	NA	NA	0.783
Chloroform	0.43	5.9	6.1	2.2	2 E-2	8 E-2	3 E-3	1 E-5	6 E-5	2.0	3 E-6	1 E-5	0.496
Cis-1,2- Dichloroethene	28	540	321	162	NA	NA	4 E-2	NA	NA	8.8	NA	NA	3.17
Methylene Chloride	2.9	42	29	11.0	4 E-3	2 E-3	9 E-2	1 E-5	6 E-6	0.314	3 E-6	1 E-6	0.084
Tetrachloroethene	0.5	5.5	9.8	2.8	2 E-2	1 E-2	6 E-1	2 E-5	1 E-5	0.0158	4 E-6	2 E-6	0.003
Trichloroethene (TCE)	1.1	12	17.1	4.9	7 E-3	4 E-1	4 E-2	1 E-5	8 E-4	0.470	2 E-6	1 E-4	0.095
Toluene	310	6300	3400	1797	NA	NA	4 E-1	NA	NA	8.2	NA	NA	3.08
Trans-1,2- Dichloroethene	78	1300	893	390	NA	NA	7 E-2	NA	NA	12.2	NA	NA	3.81
Vinyl Chloride	0.13	1.3	1.0	0.3	3 E-1	3 E-2	1 E-1	3 E-5	4 E-6	0.0093	5 E-6	5 E-7	0.002
Freon 113	NA	NA	NA	NA	NA	NA	3 E+1	NA	NA	NA	NA	NA	NA
1,2-dichloropropane	NA	NA	NA	NA	4 E-2	7 E-2	4 E-3	NA	NA	NA	NA	NA	NA
1,2-dichlorobenzene	NA	NA	NA	NA	NA	NA	2 E-1	NA	NA	NA	NA	NA	NA
1,2,4-trichlorobenzene	NA	NA	NA	NA	NA	NA	2 E-1	NA	NA	NA	NA	NA	NA
1,1,1 - Trichloroethane	NA	NA	NA	NA	NA	NA	2 E+0	NA	NA	NA	NA	NA	NA
1,1,2 - Trichloroethane	NA	NA	NA	NA	6 E-2	6 E-2	1 E-2	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	1 E+0	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	1 E+0	NA	NA	NA	NA	NA	NA
Freon 11	NA	NA	NA	NA	NA	NA	7 E-1	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	1 E-1	NA	NA	NA	NA	NA	NA
Total^a								2 E-4	9 E-4	37.9	3 E-5	2 E-4	13.9
									1 E-4			2 E-5	

ug/m³ - micrograms per cubic meter
 CSF - Cancer Slope Factor
 EPA - Environmental Protection Agency
 HI - Hazard Index

mg/kg/d - milligrams per kilogram per day
 mg/m³ - milligrams per cubic meter
 ppmv - parts per million volume
 TCE - trichloroethene

^a The cancer risks presented here include those associated with the proposed revised CSF and the previous USEPA CSF, respectively.

TABLE 6-1

NON-VOC REMEDIAL ACTION SITES
HISTORY AND BACKGROUND
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 1 of 2)

Site Name	Location	Past Use	Site Description	Site Conditions	Current/Future Land Use
OU B1 (SA 12A, SA 12B, SA 13, and PRL 29)	Southwestern portion of McClellan	Storage lot, former transformer storage, loading and unloading area, and three drainage ditches.	The area is approximately 18 acres in size. The site is relatively flat. Nearby off-site areas are zoned residential and light industrial.	An asphalt cap covers the OU B1 former storage areas. The cap is fenced and access is limited to the tenant and Air Force Personnel. The unlined drainage channels have been remediated through excavation, and necessary restrictions are used on the lined portion of the channel.	Currently used by tenant (Hampton Door Company) to store pallets of wood and related supplies used in their door manufacturing.
OU D Cap (CSs 1, 2, 3, 4, 5, 6, A, S, T, and 26)	Central-western portion of OU D	Sludge disposal pits.	CSs 1, 2, 3, 4, 5, A, S , and T cover approximately 171,000 square feet and contain approximately 2,220,000 cubic feet of debris and industrial sludge. CS 26 covers an area approximatley 42,500 ft ² .	An engineered cap (geomembrane liner) covers eight of the landfill sites and the cap is covered with grasses and bare soil. The site is fenced and access is limited to Air Force Personnel. CS 26 is partially covered with an asphalt parking lot and road.	Site is currently unused due to the presence of contaminants beneath the cap. Future use is dependent on final remedy selected. However, the proposed use would be industrial.
PRL S-033	Northwestern portion of OUB	Chemical and chemical waste storage facility from 1955 to 1980. Incoming chemicals were received and distributed in Building 786A. Materials handled included acids and bases, fuels and oils, paints, SVOCs, and solvents. No reports of spills within the building are available.	The site is approximately 0.3 acres is size and consists primarily of a portion of Building 786A. External to the building is a loading dock and driveway leading to an asphalt access road.	Highly developed area. On either side of the concrete ramp are unpaved soils placed following the completion of the removal action. Small grass covered area with picnic tables to the south of the site. Water in the unlined surface drainage ditch west of the site flows from north to south into a stormwater culvert which discharges to the unlined OU B1 drainage ditch, which flows to Magpie Creek. No potential sources of groundwater contamination.	Currently, Building 786A houses a tenant, Beutler Heating and Air Conditioning.
PRL 32	Southern OU C in IC 11	A former hazardous waste and low-level radioactive waste storage area used between 1956 and 1978.	PRL 32 is an open field approximately 25,600 ft ² in size. A concrete slab covered by 3 to 6 inches of soil and a fenced area approximately 600 ft ² in size are located at the site.	The site surface consists of soil supporting grasses, and pieces of asphalt and gravel mixed in the soil. Fencing isolates an area where surface soil contamination was detected.	Current land use: open field with a parking lot. Future land use: commercial or industrial in nature.

TABLE 6-1

NON-VOC REMEDIAL ACTION SITES
HISTORY AND BACKGROUND
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 2 of 2)

Site Name	Location	Past Use	Site Description	Site Conditions	Current/Future Land Use
CS-10	Northern OUC in IC 19	Inactive disposal pit that was used from 1949 to the mid 1960s. The site was used for disposal of low-level radioactive waste, including, but not limited to laboratory wastes from a radiation laboratory, as well as from luminescent paints applied to dials and aircraft parts.	Site is 2 acres in size and varies in depth from 10 to 30 feet bgs.	A weatherization tent covers the entire CS 10 site to prevent rain and rainwater run-on from entering the disposal pit. A drainage system was constructed around the tent to convey rainwater away from the site and prevent a storm surge from impacting the adjacent seasonal creek. Furthermore, excavated soils are containerized and stored inside the tent. On-going monitoring includes sampling in the adjacent ditches.	Open field.

bgs - below ground surface level
CS - confirmed site
ft² - square feet
IC - investigation cluster
OU - operable unit
PRL - potential release location
SVOC - semivolatile organic compound

TABLE 6-2

NON-VOC REMEDIAL ACTION
SITE SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 1 of 5)

Site Name	Location	Previous Investigations	COPCs	Baseline Risk Assessment	COCs (maximum concentration detected during RI)	RAOs	Response Action
OU B1 (SA 12A, SA 12B, SA 13, and PRL 29)	Southwestern portion of McClellan	1985 - Investigation to determine the presence of buried waste at PRL 29 1987 - Investigation to determine cleanup of an oil spill 1990 - Shallow soil gas investigation 1991/1992 - OU B RI to investigate the presence of PCBs and other contaminants	<u>Soil</u> arochlor 1260, dioxins (PeCDD, PeCDF), furans, petroleum hydrocarbons (motor oil and heavy hydrocarbons), TCE, PCE, cis-1,2-DCE, semi volatile organic compounds (1,2,4-TCB), PAHs, arsenic, cadmium, lead, selenium, silver, zinc, benzene, chromium, copper, 1,1-DCE <u>Surface Water</u> PCBs, dioxins, furans	<u>Cancer Risk</u> Above USEPA acceptable level of 1×10^{-4} for the current worker and current offsite residential scenario <u>Hazard Indices</u> Current worker 0.012 Current Off-site Residential 0.29 Hypothetical On-site Residential 1.4	<u>Soil (mg/kg)</u> arsenic (47), benzene (0.0029), cadmium (49), chromium (590), copper (410), benzo(a)anthracene (0.68), benzo(a)pyrene (0.67), dioxins/furans (0.0178), iron (97,000), lead (2,500), mercury (7.5), molybdenum (20), arochlor 1260 (240,000), selenium (52), silver (74), PCE (0.016), TCE (0.012), zinc (1,100), nickel (160)	Reduce the cancer risk to less than 1×10^{-6} and hazard index to less than one. PCBs to <10mg/kg soils less than 3ft bgs PCBs <100mg/kg soils grtr than 3ft bgs Dioxin/furan <1µg/kg (2,3,7,8-TCDD equivalent) Note: The above listed values represent IROD designated levels, however, the Initial Parcel Feasibility Study cleanup level for PCBs is 0.063 mg/kg (which corresponds to a cancer risk of 1×10^{-6}).	1993 - A time critical removal action was conducted to install a high density polyethylene liner over the site. 1994 - Contaminated soils were consolidated and covered with an asphalt cap. 2002 - Unlined drainage ditches were excavated and contaminated soils were removed. Necessary restrictions were implemented in the gunite lined ditch. The 2002 remedial action of the drainage ditches used the following for RAOs: 1) non-detect values for PCBs (0.025 mg/kg) and PAHs (0.00056 mg/kg); 2) benthic invertebrate toxicity equivalent concentration levels for dioxins and furans (0.86×10^{-6} mg/kg for Total TCDD/Furans) and 3) background levels for metals.

TABLE 6-2

NON-VOC REMEDIAL ACTION
SITE SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 2 of 5)

Site Name	Location	Previous Investigations	COPCs	Baseline Risk Assessment	COCs (maximum concentration detected during RI)	RAOs	Response Action
OU D Cap (CSs 1, 2, 3, 4, 5 ,6, A, S, T, and 26)	Central-western portion of OU D	<p>1984 - Shallow Exploration Investigation found that highest VOC, SVOC, and metals contamination were located in CS 2 and CS 5 in the middle of the site.</p> <p>1991 - Soil gas investigation indicated that highest VOC concentrations were beneath CS 2 and CS 5 in the middle of the site.</p> <p>1997 - Radiation summary report recommended further radiological investigation if the cap is removed.</p> <p>1998 - Supplemental RI conducted to examine potential radiological contamination. Results indicated no radiological contamination is present in the surface soil and that surface exposure to radiation is consistent with background levels.</p>	<p><u>Soil</u> vinyl chloride, 1,1,1-TCA, 1,1-DCE, TCE, 1,2-DCA, Freon 113, pesticides, PCBs, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, manganese, nickel, lead, vanadium, OCDD, PCDD, trichloroethene, trichloromethane</p> <p><u>Groundwater</u> TCE1,1-DCE, PCE, 1,1,1-TCA, Freon 113, pesticides, PCBs, dioxins/dibenzofurans, 1,2 Dichloroethane, trichloroethene, trichloromethane</p> <p><u>Soil Gas</u> TCE, PCE, 1,1,1-TCA, 1,1-DCE, Freon 113, benzene, toluene, xylene, naphthalene, pyrene, PAHs</p>	<p><u>Human Health</u> Inhalation cancer risks based on TCE for on base worker is 8×10^{-7} and for offbase resident is 1.4×10^{-9}. The hypothetical future onbase resident ingestion of groundwater cancer risk based on 1,2-DCE, 1,2-DCA, and TCE is 8×10^{-4}. The non cancer hazard indexes based on 1,1-DCE is 0.08 for the onbase worker through inhalation and 3.6 for the hypothetical future resident through ingestion/inhalation. These health risks would be much higher if there were complete exposure pathways to contamination in soil and soil gas and the groundwater under the cap.</p> <p><u>Ecological</u> The OU D landfills are covered with an engineered cap and do not represent an ecological concern. The areas not under the cap represent marginal habitat because they are mowed for fire protection.</p>	<p><u>Groundwater (ug/L)</u> TCE (210), 1,2-Dichloroethane (11), 1,1-DCE (93), vinyl chloride (4)</p> <p><u>Soil Gas (ppmv)</u> TCE (1.4), PCE, 1,1,1,-TCA, 1,1-DCE (13.3)</p> <p><u>Soil (mg/kg)</u> arsenic (17.3), barium (784), beryllium (0.82), cadmium (1.1), chromium (30,000), cobalt (21.9), copper (46.5), manganese (4,400), nickel (60.4), lead (15.1), vanadium (86.3), 1,1-DCE (11), TCE (172), 1,1-DCA (16), PCE (425), 1,1 TCA (687)</p>	Reduce the cancer risk to less than 1×10^{-6} and hazard index to less than one.	<p>1985 - CS 4 was excavated and the OU D cap was placed over eight landfills</p> <p>1986/1987 - 500 offbase residences were connected to the municipal water supply system</p> <p>1987 - groundwater extraction system installed</p> <p>1992/1993 - SVE system installed and began operation</p>

TABLE 6-2

NON-VOC REMEDIAL ACTION
SITE SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 3 of 5)

Site Name	Location	Previous Investigations	COPCs	Baseline Risk Assessment	COCs (maximum concentration detected during RI)	RAOs	Response Action
PRL S-033	Northwestern portion of OUB	1991 - preliminary assessment at OUB concluded that the site is a potential release location. 1992/1993 - OUB RI soil samples collected to determine if soils had been contaminated with metals, TPH, SVOCs, and PAHs	PAHs	<u>Human Health</u> PAHs in surface soils pose a greater than 1×10^{-6} cancer health risk to current workers, construction workers, and hypothetical future residents <u>Ecological</u> The site contains only marginal habitat and no further ecological risk assessment was performed.	<u>Soil (mg/kg)</u> PAHs (primarily benzo(b)fluoranthene (3.1), benzo(h)anthracene (2.4), benzo(a)pyrene (3.4), benzo(k)fluoranthene (1.9)	Lifetime cancer risk of 1×10^{-6} and non cancer hazard quotient of 1.0	2001 - 608 cubic yards of PAH contaminated soil to a maximum depth of 3 feet were removed. Final cumulative residual cancer risk is from PAHs is 5.9×10^{-7} and the non-cancer hazard index is 0.000002 Site acceptable for unrestricted future land use
PRL 32	Southern OU C in IC 11	1985 - Investigation of potential contamination. No identifiable waste or fill materials were encountered. 1985 - One soil sample collected for radionuclide analysis. Analytical data are not available. 1993 - Preliminary assessment of site in OU C performed. Identified areas needing further investigation. Determined that PRL 32 was not a significant source of soil or groundwater contamination. 1994 - 1997 - RI conducted in two phases. It was determined that PRL 32 was a source area for radium 226 contamination in soils.	<u>Non-Radiological</u> Trichloroethene (soil gas) TPH as gasoline (soil gas) Copper (soil) <u>Radiological (Soil)</u> Radium 226 Plutonium 238/239	<u>Human Health</u> Cancer risk (commercial scenario) at PRL 32 under existing conditions is 2.5×10^{-4} . <u>Ecological</u> PRL 32 was considered insignificant for ecological receptors because it comprises only bare ground and lack habitat. Therefore, no ecological risk assessment was performed.	<u>Soil</u> Radium 226 (soil) (170 pCi/g) Pu detected in waste bins at 0.204 pCi/g. Currently working on a field sampling plan to sample pit for plutonium.	2.0 pCi/g of radium 226 (selected as a reasonable cleanup goal until a final cleanup goal is established)	1995 - Area of high surface contamination was fenced. 2002 - Interim action - Excavation and off-site disposal of contaminated soils.

TABLE 6-2

NON-VOC REMEDIAL ACTION
SITE SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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Site Name	Location	Previous Investigations	COPCs	Baseline Risk Assessment	COCs (maximum concentration detected during RI)	RAOs	Response Action
CS-10	Northern OU C in IC 19	1993 - Preliminary assessment at OUC identified location as a site	<u>Non-Radiological (soil)</u> PCBs dibenzodioxins and dibenzofurans lead antimony arsenic cadmium iron manganese silver	<u>Human Health</u> Receptors include construction workers and people using contaminated surface or groundwater. Radiation construction worker cancer risk is 1.3x10 ⁻³ and residential cancer risk is 4.4x10 ⁻³ . Nonradiation risk for the construction worker is 9.1x10 ⁻⁶ (Radian, 1998, IC 19, p. 126).	<u>Non-Radiological (soil mg/kg)</u> VOCs, SVOCs, PAHs Pesticides, PCBs, Metals, TPH-D, dioxins/furans	USEPA PRG or Background values for radiological contamination	1985 - Site Investigation conducted at CS 10 through 14.
		1998 - RI at IC 19 gamma screening found radiation, geophysical survey determined buried metal, soil samples has TPH, pesticides, PCBs, dioxins, VOCs, radium 226 and metals greater than background. Groundwater samples reported VOCs greater than MCLs.	zinc freon 11 TPH pesticides		<u>Radiological</u> radium 226 (10,100 pCi/g)	Other cleanup levels will be decided in FSP.	1993 - Preliminary assessment conducted.
		2000 - Data gap investigation gamma spectroscopy reported radium 226 concentrations greater than background.		<u>Ecological</u> The site contains marginal quality habitat and is a highly disturbed area and therefore no ecological risk assessment was performed	[It should be noted that cesium-137 was also discovered during the excavation.]	Current excavation is based on visual observations.	1995 - The site was fenced to restrict access to the site.
							1998 - Remediation investigation conducted at IC 19.
							2000 - Non-Time Critical Removal Action was conducted. The action removed 109 55-gallon drums, one 20-gallon drum, and 480 cubic yards of soil. Removal action halted 6 September 2000 when a 20-gallon drum containing some plutonium was discovered.
							2002 - Time Critical Removal Action began following discovery of plutonium. Objectives of TCRA are to remove all waste material so site can be designated as NFA and exempted from reuse restrictions. All soil and drums will be excavated and sent to off-site disposal.
							2003 - TCRA continues, however, following funding shortfalls, the Air Force revised the TCRA to include stockpiling of soil and debris since November 2002 until funding becomes available. Excavated drums will continue to be
							sent to off-site disposal locations.
bgs - below ground surface COC - Contaminants of Concern COPC - Contaminants of Potential Concern CS - Confirmed Site DCA - dichloroethane DCE - dichloroethene FSP - Field Sampling Plan IROD - Interim Record of Decision MCL - maximum contaminant level mg/kg - milligram per kilogram			OCDD - Octachlorodibenzo-p-dioxin OU - operable unit PAH - polycyclic aromatic hydrocarbons PCB - polychlorinated biphenyls PCDD - polychlorinated dibenzodioxins PCE - tetrachloroethene pCi/g - picocuries per gram ppbv - parts per billion by volume PRG - Preliminary Remediation Goal PRL - Potential Release Location		RI - Remedial Investigation SA - Study Area SVE - soil vapor extraction SVE - soil vapor extraction SVOC - Semivolatile Organic Compounds TCA - trichloroethane TCE - trichloroethene TCRA - Time Critical Remedial Action TPH - total petroleum hydrocarbons USEPA - United States Environmental Protection Agency		

TABLE 6-2

NON-VOC REMEDIAL ACTION
SITE SUMMARY
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 5 of 5)

Site Name	Location	Previous Investigations	COPCs	Baseline Risk Assessment	COCs (maximum concentration detected during RI)	RAOs	Response Action
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mg/L - milligrams per liter

RAO - remedial action objectives

VOC - volatile organic compounds

TABLE 6-3

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU B1 CAP AND DRAINAGE DITCHES
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 1 of 5)

Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
1 Prevent contaminant exposure to the public and the environment through the protection of groundwater, surface water, and direct contact pathways.	<p>Asphalt cap installed over contaminated area in 1994. The cap will remain in place until a suitable remediation technology is selected in the Strategic Sites ROD.</p> <p>The drainage ditches were excavated and contaminated soil was removed. Institutional controls are in place.</p>	<p>The asphalt cap over the contaminated soil achieves the goal for the short-term. However, for this goal to be achieved long-term without a cap, the contaminated soil will require remediation to reduce the risk of exposure to the public and environment in the absence of the asphalt cap. To reduce exposure, an appropriate remediation technology must be identified and implemented.</p> <p>The unlined ditches are available for unrestricted use and this goal has been met. The gunite lined ditch requires restrictions to control access to underlying, potentially contaminated soils.</p>	<p>Remediate the contaminated soil upon selection of a suitable remediation technology.</p> <p>Continue to monitor the institutional controls for the asphalt cap and gunite lined ditch.</p>
2 Reduce the site's cancer risk to at or below 1×10^{-6} , and reduce the non-carcinogenic Hazard Index to at or below 1.0	Asphalt cap installed over contaminated area and excavation of contaminated soils in drainage ditches.	The cap installation and excavation of the unlined drainage ditches has reduced the risk to human health and the environment by eliminating the exposure pathway that would contribute to risk.	Evaluate long-term solutions to reduce risk in Strategic Sites ROD.
3 Meet applicable or relevant and appropriate requirements (ARARs).	The selected response actions comply with federal and state requirements that are legally applicable, or relevant and appropriate.	Goal achieved.	None.
4 Remediate soils containing >10 mg/kg PCBs from the surface to 3 ft bgs, >100 mg/kg PCBs for soils >3 ft bgs, and >1 µg/kg dioxin/furan (2,3,7,8 TCDD equivalent)	Remediation technologies were evaluated for a number of years to demonstrate their potential to remediate PCB contaminated soils.	The three treatment methods being evaluated for the ROD are: ex situ thermal treatment, excavation, and capping. The recommended remedial alternative will be presented in the Strategic Sites ROD. Treatability studies have demonstrated that ex-situ thermo desorption achieves these goals. Excavation and off-site disposal will also meet these goals at the site.	Remediate the contaminated soil upon selection of a suitable remediation technology.

TABLE 6-3

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU B1 CAP AND DRAINAGE DITCHES
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 5)

Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
5 Remediate drainage ditch sediments to the extent that one of the following is met: contaminant concentrations in sediments are equal to or less than background levels; excess cancer health risk is at or below 1×10^{-6} or non-carcinogenic Hazard Index is at or below 1.0	The contaminated sediment in the unlined drainage ditches has been removed. Institutional controls have been implemented for the lined portion of the drainage ditch.	Goal achieved.	None.
6 Select alternatives that include treatment, where applicable and practicable, particularly for principal threats, i.e. for soils containing >500 mg/kg PCBs.	Refer to number 4.	Refer to number 4.	Refer to number 4.
7 Contain soils that pose a long-term threat where treatment is not practicable.	Refer to number 1.	Refer to number 1.	Refer to number 1.
8 Prevent the migration of contaminated soil particles to OU B1 Ditches and Magpie Creek.	Installation of the asphalt cap minimizes the potential for contaminated soil to migrate to the drainage ditches via stormwater runoff and wind. Contaminated sediment in the drainage ditches has been removed. The sediment traps are still in place and prevent the transport of any contaminated sediment that may enter the drainage ditches from reaching Magpie Creek.	This goal has been achieved in the short-term by the installation of the asphalt cap. However, the IROD recommendation is to evaluate and identify cost-effective remediation technologies proven to remediate contamination within OU B1 to levels at which public health and the environment are no longer contingent upon the integrity of the asphalt cap. Until this is achieved, a good inspection and maintenance program for the asphalt cap will ensure the continuing achievement of this goal and may be viable as a long-term remedy for this site.	Continue current inspection and maintenance program for asphalt cap. Continue removal of sediment from drainage ditch sediment traps and monitoring of chemical concentrations in the accumulated sediment.

TABLE 6-3

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU B1 CAP AND DRAINAGE DITCHES
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 3 of 5)

Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
9 Ensure that discharges from OU B1 ditches cannot cause the receiving water to exceed any of the listed concentrations in the California Inland Surface Waters Plan (CISWP) or McClellan stormwater discharge permit.	Grab samples of stormwater are collected several times per year in two locations: just prior to entry into Magpie Creek and 15 to 20 feet downstream of the entry point in Magpie Creek.	The asphalt cap ensures that the water entering the drainage ditches is primarily uncontaminated stormwater runoff. The only pathway for contaminated storm water originating from the OU B1 cap to enter the ditches is for cracks to form or subsidence of the cap to occur so that the underlying contaminated soil is exposed to stormwater and/or wind. If this occurs, contaminated soil may be washed or blown into the drainage ditch. The current operations and maintenance program consists of quarterly inspections and repairs, if necessary, of the cap and drainage system. To date, there have been no failures that could allow contaminated soils to enter the drainage ditches.	Continue current inspection and maintenance program for asphalt cap. Monitor the stormwater data to verify that discharges do not exceed the CISWP or discharge limits.
10 For capping alternatives, cap must: <ul style="list-style-type: none"> - Hold up under current DRMO operations - Allow minimal rainwater infiltration - Have a design life span of 30 years - Allow for potential future treatment of PCB principal threats - Prevent erosion of soil beneath cap - Be maintained throughout its design life to eliminate direct contact and inhalation pathways 	The installation and operation and maintenance of the asphalt cap have been designed to meet these requirements.	Quarterly inspections have been ongoing since the cap was installed to ensure that the asphalt cap has remained intact and is operating properly and successfully. Several types of problems are typically identified during each inspection. The most common problems are gouges and punctures from improper equipment storage or operation, and areas of asphalt softening caused by oil spills or leaks from stored equipment. The damaged areas are then patched or replaced.	Continue quarterly inspection and maintenance program.
11 Optimize cost/risk reduction quotient.	The costs were evaluated during the remedy selection process in the Interim Record of Decision (Radian, 1993b).	The implementation of the remedial action (capping with treatability studies) is achieving this objective.	None.

TABLE 6-3

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU B1 CAP AND DRAINAGE DITCHES
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 4 of 5)

Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
12 Include potential for "dual track" remediation (i.e. perform expedited remedial action now and continue to evaluate options to further remediate contaminated soil in the future).	This objective was addressed during the selection of the interim remedial action in the Interim Record of Decision (Radian, 1993b).	Potential for "dual track" remediation will be evaluated again in the Strategic Sites FS.	Remediate the contaminated soil upon selection of a suitable remediation technology.
13 Implement institutional controls to 1) ensure land use will remain industrial; and 2) mitigate short-term impacts and/or 3) supplement engineering controls.	A general clause is included in the Basewide Comprehensive Lease that states that the lessee must comply with the provisions of any hazardous substance remediation or response agreement with environmental regulatory authorities. This would include any institutional controls associated with the remedial action process. Specific language regarding institutional controls will be included in the supplemental lease to be prepared when possession of the property is actually transferred to the Local Reuse Authority.	This objective has been achieved for the short term.	Reevaluate LUCs for the ROD.
14 Consolidate contaminated soils and sediment from discrete areas (drainage ditches, etc) at OU B1 to optimize remediation.	<p>In 1994, the upper 18 inches of soil were excavated from those portions of PRL 29, SA 13, and the southern half of SA 12A at which PCB concentrations exceeded 10 mg/kg. The excavated soil was consolidated in the northwestern portion of the DRMO storage yard before it was covered by the asphalt cap.</p> <p>Any soil remaining upon selection of a treatment technology will be treated along with soil from the site. Documentation of these activities can be found in the Data Gap Field Sampling Plan, OU B1.</p> <p>Contaminated sediment from the sediment traps and in the drainage ditches has been removed and shipped off-site for disposal.</p>	Contaminated soil was consolidated under the cap.	None.

TABLE 6-3

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU B1 CAP AND DRAINAGE DITCHES
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

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Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
15 Reduce potential for VOC migration and construct wells to monitor VOCs in soil gas, and in the final ROD, consider remedial actions to reduce the potential for VOC impacts on groundwater.	<p>Installation of the asphalt cap limits the migrations of VOCs by eliminating the transport mechanisms. For example, percolation of storm water through the contaminated soil causing downward migration of VOCs is not an issue since the asphalt cap is impermeable to storm water. Similarly, the asphalt cap also restricts permeation of VOC laden soil gas to the atmosphere.</p> <p>Surface water and groundwater monitoring of the area are conducted by McClellan AFB under the Groundwater Monitoring Plan and the National Pollution Discharge Elimination System (NPDES) Stormwater Program. Soil gas monitoring for VOCs in the vadose zone is not required under the OU B1 O&M Manual, as documented in the OU B1 Operations and Maintenance Addendum (Radian, 1996). However, soil gas monitoring is being addressed the SVE program.</p>	Soil gas monitoring will be addressed under the SVE program. The cap installation effectively removes the potential for VOC migration via percolation, achieving the goal for this interim action.	<p>Continue groundwater monitoring and evaluate sample results to ensure that VOC migration from OU B1 soils is not occurring.</p> <p>Remediate VOCs if found to impact groundwater.</p>

µg/kg - micrograms per kilogram
 ARAR - appropriate or relevant and applicable requirements
 CISWP - California Inland Surface Water Plan
 DRMO - Defense Reutilization and Marketing Office
 FS - Feasibility Study
 ft bgs - feet below ground surface
 IROD - Interim Record of Decision
 LUCs - Land Use Controls

mg/kg - milligram per kilogram
 O&M - operation and maintenance
 OU - operable unit
 PCB - polychlorinated biphenyls
 ROD - Record of Decision
 SVE - Soil Vapor Extraction
 VOC - volatile organic compounds

* Source: Operable Unit B1 Interim Record of Decision (ROD), Radian Corporation, 1993b

TABLE 7-1

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
OU D CAP
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Remedial Action Objective*		Action Taken to Meet Objective*	Performance and Progress Toward Goals*	Recommendations
1	Reduce infiltration and limit migration of the less mobile contaminants (i.e., metals, pesticides/PCBs, dioxins, and semivolatile organic compounds).	CSs 4, 6, and 26 were excavated and backfilled to remove contaminated soil. In 1985, the OU D cap was placed over eight of the CSs.	The cap has been successful at limiting surface water infiltration to contaminated soils.	Continue maintenance of the engineered cap.
2	Eliminate risks to offbase residents from contaminated groundwater.	In 1986 and 1987, 500 offbase residences were connected to the municipal water supply system.	The switch to municipal water supply has removed the exposure pathway for residence to contaminated drinking water.	Followup monitoring to ensure off-base wells continue to be used for non-potable purposes only.
3	Control groundwater contaminant migration and remove contaminated groundwater beneath OU D.	A groundwater extraction system was installed in 1987.	The extraction system effectively controls the spread of contaminants from the known source areas underlying the OU D low-permeability cap.	Continue the operations and maintenance and monitoring as established under the groundwater monitoring program.

CS - Confirmed Site

OU - operable unit

PCB - polychlorinated biphenyls

* Source: Operable Unit D Remedial Investigation Report, Volume 1 of 3, CH2M Hill, 1994, pp. 7-1 to 7-6.

TABLE 8-1

SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
PRL S-033
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 1 of 2)

Remedial Action Objective*	Action Taken to Meet Objective**	Performance and Progress Toward Goals**	Recommendations
1 Remove non-VOC contaminants in soil that could pose human health and ecological risks through direct contact exposure pathways (i.e., soil ingestion, dermal contact, or inhalation of suspended dust). RAOs for protection of human health require individual contaminant concentrations at a site be reduced to achieve an excess lifetime cancer risk of at or below 1×10^{-6} and a noncancer hazard quotient of at or below 1.0	Approximately 608 cubic yards of soil with PAH levels above the benzo(a)pyrene equivalent concentration of 0.062 mg/kg (EPA Region 9 residential PRG value) were excavated and removed from PRL S-033 in 2001. An initial scoping Ecological Risk Assessment was conducted to determine which sites contain ecological resources.	Confirmation sampling was completed and verified that all soil with PAH levels above the residential PRG was removed. A final human health risk assessment was performed and verified that the cumulative residual cancer risk from PAHs is less than 1×10^{-6} (5.9×10^{-7}) and that the non-cancer hazard level is less than 1 (0.000002). The scoping report recommended no further ecological investigations at the site because the site is covered by buildings, asphalt, or concrete and therefore, lacks both habitat and a complete exposure pathway.	None.
2 Remove or mitigate non-VOC contaminants in soil that could migrate and pose a future threat to groundwater.	Predictive migration modeling was conducted to determine if PAHs reported in soils at PRL S-033 could migrate to groundwater.	Modeling results indicate that none of the contaminants at the site will reach the capillary fringe in detectable concentrations within 30 years.	None.
3 Remove non-VOC contaminants in soil that could pose a threat to surface water through runoff.	Analytical modeling was performed to determine if PAHs reported in soils at PRL S-033 could migrate to surface waters.	Results of modeling indicate that surface water runoff from the site would be less than the one-in-a-million cancer risk estimate established by USEPA National Ambient Water Quality Criteria (USEPA, 2000).	None.
4 Conduct the removal action in a manner that limits the need for future restrictions on land use.	Following removal of the PAH contaminated soil the residual cancer risk from PAHs in soil is less than 1×10^{-6} and the non-cancer hazard index is less than 1.	The site is suitable for unrestricted land use and no institutional controls are required.	None.

TABLE 8-1

SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
PRL S-033
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

(Page 2 of 2)

Remedial Action Objective*	Action Taken to Meet Objective**	Performance and Progress Toward Goals**	Recommendations
5 Minimize the volume of contaminated soils from the removal action through accurate site characterization and modeling.	The volume of soil estimated in the EE/CA was 279 cubic yards. However, the actual volume was approximately 608 cubic yards.	PAH contamination was observed at a depth of over 2 feet below ground surface. Previous site investigations may not have considered that construction in the area may have created a pathway for PAH contamination to migrate to this depth.	None.

EE/CA - Engineering Evaluation/Cost Analysis

mg/kg - milligram per kilogram

PAH - polycyclic aromatic hydrocarbons

PRG - Preliminary Remediation Goal

RAO - remedial action objectives

VOC - volatile organic compounds

* Source: Non-VOC EE/CA Document and Work Plan for PRL S-033, CH2MHill, 2000 (pages 2-1 and 2-2)

** Source: Final Removal Action Report PRL S-033, Roy F. Weston, Inc and Kleinfelder, Inc, 2002 (Pages 12, 13, 22, 32, 36, and 39)

TABLE 9-1

SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
PRL 32
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
1 Reduce the total radium-226 contamination, including background, to less than or equal to 2.0 pCi/g.	Soil contaminated with radium 226 was excavated and sent for offsite disposal.	Contaminated soil has been removed from the site.	None.
2 Complete any actions in a manner consistent with the final remedial action plan and the long-term use for this site.	All activities were conducted in a manner consistent with the Workplan.	Contaminated soil has been removed from the site.	None.
3 Reduce the potential for transport of radium-226 contamination present within surface soils to off-site receptors via air and surface water pathways.	Soil contaminated with radium 226 was excavated and sent for offsite disposal.	Contaminated soil has been removed from the site.	None.
4 Properly dispose of waste generated by the removal action.	Soil contaminated with radium 226 was excavated and sent for offsite disposal.	Contaminated soil has been removed from the site.	None.

pCi/g - picoCuries per gram

* Source: CS 10 and PRL 32 Engineering Evaluation/Cost Analysis, Radian International, 1999b, p. ES-3.

TABLE 10-1

SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES

CS 10

FIVE-YEAR REVIEW

FORMER McCLELLAN AIR FORCE BASE

SACRAMENTO, CALIFORNIA

(Page 1 of 2)

Interim Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
1 Reduce the final site radionuclide, non-VOC, and inorganic species concentration to levels designated in the Final Status Survey Field Sampling Plan that are protective of human health and the environment and agreed to by stakeholder regulatory agencies.	Excavate and remove drums.	The current Time Critical Removal Action (TCRA) includes excavation and disposal of buried drums.	Continue activities associated with TCRA.
2 Removal of landfill debris.	Excavate and remove drums and other debris.	The current TCRA includes excavation and disposal of buried drums.	Continue activities associated with TCRA.
3 Removal of drums potentially contaminated with radiological waste.	Excavate and remove drums.	The current TCRA includes excavation and disposal of buried drums.	Continue activities associated with TCRA.
4 Off-site disposal of all materials removed.	Excavate and remove buried drums. Contaminated soil is being stockpiled until funding becomes available. All contaminated soil will be sent to off-site disposal.	The current TCRA includes excavation and disposal of buried drums.	Continue activities associated with TCRA.

TABLE 10-1

**SUMMARY OF PROGRESS TOWARDS MEETING REMEDIAL ACTION OBJECTIVES
CS 10
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

(Page 2 of 2)

Interim Remedial Action Objective*	Action Taken to Meet Objective	Performance and Progress Toward Goals	Recommendations
5 Removal of all waste material in the CS 10 landfill so that the site can be designated No Further Action for Non-VOCs and exempted from the reuse restrictions normally associated with landfills.	Excavate and dispose of contaminated soil and drums.	Activities associated with the current TCRA include the proper transport and disposal of contaminated soil and buried drums.	Continue activities associated with TCRA.

TCRA - time critical removal action

VOC - volatile organic compounds

* Source: Removal Action Workplan for CS 10 TCRA, Final, URS, 2001d, July.

TABLE 12-1

**REUSE SELECTION FOR McCLELLAN
FIVE-YEAR REVIEW
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA**

Planned Reuse	Y/N	Public Benefit Conveyance Responsible Agency * (If Any)
Residential		
Housing	Y	
Daycare	Y	
Hospitals	Y	
Schools	Y	Department of Education
Dental Clinic	Y	
Other	Y	
Office	Y	
Commercial	Y	
Industrial	Y	
Recreation	Y	National Park Service
Agriculture	N	
Airport	Y	
Public Safety Training	Y	FEMA

FEMA - Federal Emergency Management Agency

* Responsible Agency is only identified for public benefit conveyance